WORKBOOK OF TECHNICAL ENGLISH 2

(Part 2) *Curs 1995-96*

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	NAME	DEFINITION	DESCRIPTION OF STRUCTURE (explains the defining characteristics)	EXAMPLES
CLASS 1		those which...	The bonding is... ...on heating the molecules...	

	NAME	DEFINITION	DESCRIPTION OF STRUCTURE (explains the defining characteristics)	EXAMPLES
CLASS 2		those which...	The molecular chains are... ...on heating there is no... of the chains	

UNIT 5.

5. CAUSALITY AND RESULT.

It is particularly important to understand the different ways of expressing **the relationship between the causes and the effects of an action,** since this cause-effect relationship is very commonly used in academic texts.

If an argument begins with effects or results, the causes are the reasons that logically led to those results. For example, if CAUSE A is the reason for EFFECT B, then EFFECT B is the result of CAUSE A. This relationship can be unmarked, but normally it is marked.

CAUSE A EFFECT B (Result)

ex: **Dust results in | the deterioration of the recording conditions of disks.**

or

EFFECT B (Result) CAUSE A

ex: **Deterioration in the recording condition of disks** | is caused by **dust.**

5.I VERBS USED TO EXPRESS CAUSALITY AND RESULT.

It is the choice of verbs and expressions in a sentence what will indicate a cause-effect relationship.

The following **VERBS** are used to link a cause with an effect:

CAUSE A-->EFFECT B

*CAUSE / PRODUCE
*RESULT IN
*LEAD TO
*BRING ABOUT
*GIVE RISE TO

EFFECT B<--CAUSE A

*BE CAUSED / PRODUCED BY
*RESULT FROM

ex: The idea of keeping instructions for the computer inside the computer memory ***brought about*** significant changes in computer technology. (A--->B)

ex: Most road accidents ***are caused by*** human errors (B<---A)

EXERCISES.

1) Read the following statements and identify the cause and the effect in each sentence.

1.- Many industrial accidents are caused by carelessness.

2.- Polluted water supplies lead to epidemics.

3.- Accidents in factories often result from ignorance of safety regulations.

4.- The use of electrical equipment by unqualified people may give rise to fatal accidents.

5.- Exposure to traffic fumes may result in lead poisoning.

6.- The smoking of more than ten cigarettes a day by a pregnant woman can cause retardation in the foetus.

7.- Air pollution can bring about pulmonary diseases.

8.- Dependence on drugs gives rise to family and financial problems.

9.- Short circuits are produced by insulation breakdown.

2) Fill in the blanks using one of the verbs given in 11.I and identifying the cause and the effect. All the examples are concerned with Electronics and Electrical Engineering.

1.- Glare____________________________discomfort to the eyes.

2.- Eddy currents____________________________power losses in transformers.

3.- Damage to semiconductors______________________excessive heat.

4.- Bad joints____________________________faulty soldering.

5.- Sparking______________________interference in receivers.

6.- Arcing across the points__________________failure of a point.

7.- Exceeding the motor rating_________________breakdown of the motor.

8.- Faulty earth connections_________________________serious accidents.

5.II SENTENCE CONNECTORS USED TO EXPRESS A CAUSE.

·The following connectives are used to specify a cause. They are divided into three groups according to their grammatical differences:

1)

CAUSE

*BECAUSE OF
*AS A RESULT OF
*DUE TO + NOUN / GERUND
*OWING TO
*ON ACCOUNT OF

ex: ***Because of*** the rapid expansion of the market for mainframe computers, companies such as General Electric and RCA entered the field.

ex: ***As a result of*** the combustion of/ burning coal, carbon dioxide is given off.

2)

CAUSE

*BECAUSE
*SINCE + clause
*AS

ex: ***Because*** the printing element of line printers is so simple and has no moving parts, they are cheap and silent.

ex: A computer is not a single-purpose machine, ***since*** instructions can be combined in an infinite number of sequences.

3)

CAUSE

*THE REASON FOR (THIS) IS THAT...
*THE REASON WHY..... (because....) + phrase
*THIS IS BECAUSE OF /
THE RESULT OF /
DUE TO.........

ex: ***The reason why*** the experiment failed is because the scientist did not check all the data.

ex: The experiment finally failed. ***This is due to*** the inexperience of the scientist who did not check all the data.

EXERCISES.

3) Complete the following sentences in any way that makes sense.

1.- As a result of______________________________________, that student failed the exam.

2.- Owing to_____________________of the matriculation fee in the School of Modern Languages of UPC to study English, the students refused the offer of the university.

3.- On account of______________________________, the company lost a lot of money and left the (computer) business.

4.- The company had to close down as the oil prices____.

5.- Since children find it easier to learn computers,____.

6.- Many people are in danger of losing their jobs to computers. This is due to______________________________.

7.- Because of____, many people are afraid of computers.

8.- Many people who buy computers don't need them. This is because____.

9.- Most of the software written for school use is boring and uninteresting. The main reason for this is that____.

10.- Due to______________________________________,many script-writers are buying word processing computers.

11.- More and more robots are being used for tasks like welding and painting. This is due to____.

12.- The reason why________________________________was because his English was not good enough.

13.- The computer business is going up steadily. This is the result of____.

14.- Because____, most students have to learn English at some point.

5.III SENTENCE CONNECTORS USED TO EXPRESS A RESULT.

The following sentence connectors are used to introduce a result of something that occurs in the first clause or sentence:

1) It links two clauses; reason in the first clause.

*SO

ex: Japanese manufacturers are selling high-quality electronic components at prices below those of American manufacturers, ***so*** they are gaining a large share of the American market.

2) They link sentences; reason in the first sentence.

*THEREFORE
*CONSEQUENTLY
*THUS
*HENCE
*AS A RESULT
*AS A CONSEQUENCE
*FOR THIS REASON

ex: IBM has become more aggressive. ***As a result,*** the market share of most of IBM's competitors has dropped.

ex: The measuring experiments were defective.
Therefore, | the experiment was a failure.
Hence,
Consequently,

EXERCISES.

4) Finish these sentences in any way that makes sense:

1.- The computer profession is changing very rapidly. For this reason________________________________.

2.- A lot of managers feel jealous when they see a brand new computer on a colleague's desk. Consequently,________
____.

3.- More and more students in our school are realizing how important it is to know English for their professional careers, so________________________________.

4.- The cost of satellite communications began to fall. Therefore, they________________________________.

5.- The economy of the country was suffering a strong recession. As a consequence,__________________
_________________________.

6.- The capacity of satellites has increased enormously. Thus,______________________________________.

5) Keeping in mind what you have learnt in 5.II and 5.III, choose the right option for the following sentences.

1.- Low orbit satellites are of little use for telecommunications (SO / SINCE) they are only in line of sight for about 15 minutes.

2.- Geosynchronous satellites travel at the same speed as the earth. (BECAUSE OF / THEREFORE), they are much used for telecommunications.

3.- Soft iron is used in electromagnetics (BECAUSE / THUS) it can be magnetized easily.

4.- Transistors can be damaged by heat. (THE REASON WHY / CONSEQUENTLY), great care must be taken when soldering transitors.

5.- Copper is often used for cables (SINCE / THUS) it is a good conductor.

6.- Alternators are preferred to dynamos for cars (AS / FOR THIS REASON) they give higher outputs at low speeds.

7.- The motor overheated (BECAUSE OF / BECAUSE) dirt in the air gap.

8.- The flow of electrons through an insulator is very small. (THIS IS DUE TO / HENCE) it can be ignored.

9.- A cathode-ray tube screen glows when an electron beam strikes it. (THIS IS DUE TO / SO) the fact that the screen is coated with a phosphor.

10.- DC motors are used for cranes (DUE TO / SINCE) their speed can be well controlled.

11.IV OTHER SPECIAL STRUCTURES.

When we want to show how the action of one thing can affect another, we can use verbs like:

*CAUSE *ENABLE *FORCE *ALLOW	+	Noun / Pronoun + TO (Verb)

ex: The flow of current through the filament ***causes*** the bulb ***to*** light.

ex: Energy is the property of something that ***enables*** it ***to*** do work.

ex: A valve ***allows*** liquid ***to*** flow one way.

When we want to show how the action of something can be avoided, we can use verbs like:

*KEEP *PREVENT *STOP	+ Noun / Pronoun + FROM ...ING

ex: A valve can also ***prevent / stop*** liquid ***from*** flowing the other way.

EXERCISES.

6) Now express these ideas using the verbs in brackets. You will have to change the structure of the second part of the sentence.

1.- (CAUSE) The nuclear fission ---> heat energy is released.

____

2.- (ALLOW) New technology ---> manufacturers increase production.

____

3.- (ENABLE) The use of satellites ---> scientists can predict the weather.

____

4.- (PREVENT) The recording of data ---> data are cleared.

____

5.- (ALLOW) Electron microscopes ---> we can see things only a fraction of a millimetre in size.

____

6.- (PREVENT) Paint ---> iron becomes rusty.

____

7.- (CAUSE) Burning fossil fuels ---> the ozone layer of the Earth's atmosphere breaks down.

____

8.- (ENABLE) The gaps in railway lines ---> the metal can expand without buckling in hot weather.

____

9.- (KEEP) The insulation of the wire ---> people receive an electric shock.

____

10.- (CAUSE) A force ---> an object shifts its position.

____

7) Read this text. Which paragraph answers each question?

a) How does a thermostat work?
b) How is central heating controlled?
c) What causes expansion and contraction?
d) What is the function of a thermostat?

THERMOSTATS.

Heat causes substances to expand. This is because heat causes the atoms and molecules in the substance to move more quickly. As a consequence, they take up more space. This is true for gases, liquids and solids, but gases expand much more than liquids, and liquids much more than solids. When a substance is cooled, the molecules slow down and as a result the substance contracts.

Thermostats make use of the principle of expansion. The function of a thermostat is to maintain a constant temperature over a period of time. They are used in refrigerators, heating and cooling systems and many industrial processes.

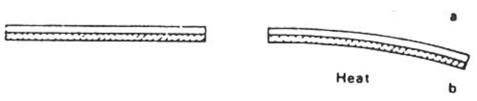
When different materials are heated, some expand more than others. For example, if brass is heated by one degree Celsius, it will expand by one fifty-thousandth of its length. On the other hand, heating copper will cause it to expand by about 90% of this. One kind of thermostat contains a strip of brass and a strip of copper which are joined to form a 'bimetallic strip'. When the strip is heated, the different metals expand by different amounts. As a result, the strip is forced to bend towards the side which expands less. This bending can be used to operate a valve or open and close an electrical circuit.

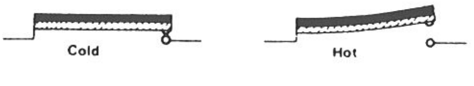
A bimetallic strip like this is used in central heating systems. It switches off the heaters when the air reaches a certain temperature, and switches them on when the temperature falls. One end of the strip can move while the other is fixed. The free end completes an electrical circuit which controls the gas or oil burner. The strip bends when it is heated. At a certain temperature the strip bends sufficiently to break the contact. Consequently, it switches off the burner. When the air cools, the strip contracts until it makes contact and switches the burner on again.

Now match these diagrams with different parts of the passage:

a) heat → molecules faster → expansion

b) heat → molecules slower → contraction

c)


d)


Say whether these statements are true or false and explain your answer.

a) The molecules in gases can move further than the molecules in liquids and solids.

b) Only gases expand when heated.

c) If copper is heated by one degree Celsius, it will expand by about one forty-five thousandth of its length.

d) A bimetallic strip made of copper and brass will bend towards the copper side.

e) Substances contract by different amounts when cooled.

f) When a refrigerator gets warmer, its cooling system is switched on by means of a thermostat.

UNIT 6.

6. CONDITIONS AND CONJECTURES.

Conditional sentences are used to show how an action depends on the other. Therefore, they are closely related to sentences of cause-effect or reason and result. This kind of structure appears in texts where the author is simply making a ***hypothesis***. By using the modals (will, may, could, might, etc) we can show whether the action is certain to happen or its different degrees of probability.

6.I CONDITIONAL SENTENCES.

They have two parts: the **if-clause** and the **main clause**.

If it rains, I will not go out.

The if-clause can also come after the main clause. You can change the order to emphasize which interests you most by putting it at the beginning:

I will not go out if it rains.

Also notice that the comma (,) is left out when the if-clause comes second.

There are three basic types of conditional sentences:

I. If I **do** A, B **will be** the result.
II. If I **did** A, B **would be** the result.
III. If I **had done** A, B **would have been** the result.

6.I.1. CONDITIONAL SENTENCES TYPE 1: PROBABLE OR REAL.

Where the action in the if-clause is quite probable.
e.g. If you drop that test-tube, it will break.

--Pattern of the basic form:

If + Present + Future

--Possible variations of the basic form:
These variations occur only in the main clause.
a) With modal verbs *to express different degrees of probability.*

+ probable
If I do A, B must / can / may / should / ought to / could / might be the result.
- probable

b) There is another type of if-clause which is used to state ***scientific facts*** and ***general truths***. The pattern is:

If + Present + Present

e.g. If you heat ice, it melts.

c) Another common variation has an **imperative** in the main clause.

If + Present + Imperative

e.g. If he comes, give him his books.

So these are all the different patterns of conditional sentences type 1:

If + Present + Future
+ Modal verbs
+ Present
+ Imperative

EXERCISES.

1) Write correct sentences from the information given in columns A and B.

A	B
• A fuel and air mixture burns.	.contract.
• Water is heated at 100º C.	.expand.
• A load is attached to a spring balance.	.blow.
• We use a 3 A fuse with a cooker.	.boil.
• Burning gases leave a jet engine at speed.	.produce thrust.
• We move the rudder of a boat.	.produce lateral movement.
• We cool metal.	.change direction.
• You bend rubber.	.(not) receive an electric shock.
• You hit a piece of glass.	.break easily.
• You touch the plastic of an electric wire.	.leave a mark.
• We scratch an aluminium pan with a nail.	.change shape.

The first one has been done for you:

1.- If a fuel and air mixture burns, it will expand.

2.-____

3.-____

4.-____
5.-____
6.-____
7.-____
8.-____
9.-____
10.-____
11.-____

2) Now do the same as in ex. 1) but change the main clause to state a scientific fact or a general truth.

The first one has been done for you:
1.- If a fuel and air mixture burns, it expands.
2.-____
3.-____
4.-____
5.-____
6.-____
7.-____
8.-____
9.-____
10.-____
11.-____

3) Fill in the blanks using the following verbs:

be switch off exceed
come use take

1.- If this experiment __________ successful, we will win a Nobel prize.
2.- The telescope must not be rotated if the wind speed _____________ 60 Kph.
3.- If I pass this exam, I ___________ a long holiday in the U.S.A.
4.- Unless the red light _____________ on, there is no need to call the engineer.
5.- If the voltage rises above 520 v, the machine __________ immediately.
6.- If you _______________ a defective component, it is not surprising the device works badly.

4) Fill in the blanks using the following verbs:

blow change expand might contract
should be have change must

1.- Invar, which is a kind of steel, (not)__________________ its dimensions if temperature changes.
2.- If the length of a pendulum changes, its time of vibration _______________.
3.- Changes of atmospheric pressure _______________ no effect if you use invar.

4.- It ______________ if it reaches the temperature of 4ºC.
5.- If the thermometer becomes warmer, the mercury __________
________.
6.- If the atmospheric pressure is above normal, the boiling point ________________ a little higher.
7.- If a fuse ________________ twice, there is something wrong with the circuit.
8.- If you want to pass your English exam, you _______________ study hard.
9.- If you do not go to a petrol station today, you___________ run out of petrol tonight on the way back home.
10.- If you want to go to the U.S.A., you _____________ get a Visa.

5) Fill in the blanks using the following verbs:

must   ought to   might   can
work   be   tell   take

1.- If the batteries __________ low, the instrument will not function at all.
2.- If he wants to get a good quality printing, he ___________ buy a laser printer.
3.- If the cooling water of a car freezes, the cylinder block ___________ crack.
4.- The brakes (not)______________ if the master cylinder of a car leaks.
5.- If your car breaks down, _____________ it to my brother's repair shop.
6.- If a straight line ______________ be drawn between a transmitter and a receiver, a signal will be received.
7.- If the modulating signal consists of a band of frequencies, the modulated signal _______________ consist of two sidebands.
8.- If he finishes reading my book, _____________ him to give it back.

6) Answer all these questions as in the example below:

e.g. What happens if the pressure is low?
If the pressure is low, the boiling point is low.

1.- What happens to the car battery if there is an electrical fault in a car?

____

____

2.- What will happen if you are touching the copper part of two different wires?

____

____

3.- What could happen if you put a socket next to water?

____

____

4.- What happens if one of the ends of a filament of a light bulb does not touch one of the conductors?

5.- What will happen if the headlights of a car are left on while the car is not in use?

6.- What happens if you take mercury out of a thermometer?

7.- What can happen if there is not enough oil in a car engine?

8.- What can happen if the air filter of a car is not in place?

9.- What might happen if you smoke too much?

10.- What happens if a piece of paper enters the flame?

11.- What could happen if you are not wearing gloves when dealing with a dangerous substance?

12.- What happens if you boil water?

7) Supply appropriate main statements for the following conditional clauses:

1.- If you heat alcohol to 78ºC, __________

2.- If you magnetize a mechanical watch, __________

3.- If you switch off the power supply while working with a volatile memory, __________

4.- If you play a stereo record using a defective stylus,

5.- If you don't register all those data in the computer memory, __________

6.- If a conductor is moved across a magnetic field, __________

7.- If the piston does not fit properly into the cylinder,

8.- If you try to cheat a chess-playing computer, __________

9.- If the protective relay of an electrical apparatus is removed, __________

6.I.2. CONDITIONAL SENTENCES TYPE 2: UNREAL OR IMPROBABLE.

This type of conditional sentence makes statements about things that are not real or about things that might or could be real.

e.g. If I **had** more money, I **would buy** a new PC.

--Pattern of the basic form:

If + Past + Conditional

--Possible variations of the basic form:

These variations only occur in the main clause.

a) By using modal verbs to express different degrees of probability.

+ probable

If I **did** A, B **should** be the result.
ought to
could
might

- probable

Examples:

Certain result.

If you tried again, you would be successful.

Possible result.

If you tried again, you could be successful.

or

If you didn't try again, you wouldn't be successful.

If you didn't try again, you couldn't be successful.

So these are the patterns of conditional sentences type 2.

If + Past + Conditional
+ Modal Verbs

If you have to use the verb TO BE in these conditional sentences in the if-clause, you should use the special forms "If I / he / she / it **WERE**" instead of "Was".

e.g. If I were you, I would try that again.

EXERCISES:

In a given sentence like "If he **arrived** tomorrow, we **would be** pleased" the use of the **past** (arrived) with **would**, instead of the **present** (arrive) with **will** makes the event seem unlikely.

1) Make these statements seem *UNLIKELY* by changing the verbs:

1.- If we use a very short wavelength, we will do better.

____

2.- We will see something interesting if we watch Mars next week.

____

3.- Those men will see a lot of ice if they go to the South Pole. But they are probably going to the equator.

____

4.- The jet plane will fly faster if it goes higher.

____

5.- If the professor heats that material to a temperature of 1000ºC this afternoon, it will melt.

____

____

6.- If he can carry out that experiment successfully, he will be a very important scientist.

____

____

7.- If the water goes on contracting, the pond will become a solid block of ice.

____

____

8.- If those pieces have to be made of gold, they will be very expensive.

____

____

2) Fill in the blanks using the following verbs in the right tense:

be	avoid	obtain	test	choose
can	buy	solve	use	expand

1.- If we knew the value for n, we ____________________ the equation.
2.- We could ____________ greater stability if we ____________ a quartz oscillator.
3.- If we ________________ a dipole antenna, the cost would be about 50% less.
4.- If colour TV sets were cheaper, many more people ____________________ them.
5.- If you ________________ the oscillator more carefully, you would find the fault.
6.- You ________________ many difficulties if you adopted a simpler circuit design.

7.- If mercury (not)________________________ when heated, it would not be used for making thermometers.

8.- If he ________________ pass all his exams, he would get a grant for next year.

9.- If he did not drive his car, his driving licence (not) _______________ of much use.

3) Complete the following if-clauses suitably:

1.- If we had no thermometers now,______________________
____

2.- If ice did not float on water,______________________
____

3.- If the atmospheric pressure were high,______________
____

4.- If water boiled at low temperature, ________________
____

5.- If we used the Fahrenheit scale in science, ________
____

6.- If you did not pass your exams, ___________________
____

7.- If mercury did not expand, ________________________
____

8.- If there were no gravity on earth,__________________
____

9.- If you could not sleep for eight days, _____________
____

10.- If you did not know how to do this exercise, _______
____

*If we want to show that the result is certain to happen, we use **WOULD** instead of **MIGHT**.

4) Put the verbs in brackets below into the past tense, and also make the results appear UNCERTAIN. (MiGHT)

1.- If you (get)______________ dirt in the wound, it would become poisoned.
____

2.- If that spaceship (travel)_______________ too fast, it would miss the moon.
____

3.- If the ice at the North Pole all (melt)______________, the level of the oceans would rise a lot.
____
____

4.- If we (not complete)__________________ the experiment, the professor would be angry.
____

5.- If we (can)_____________ live for hundreds of thousands of years, we should have time to travel to the stars.
____

6.- We could buy new equipment for the lab if the department (have)_______________ more money.

____

7.- They would learn more English if they (start)__________ a little earlier.

____

____

8.- Many people would not bathe in the sea if they (know) _______________ it is polluted.

____

____

9.- If we (recycle)________________ paper, we would not have to cut down so many trees.

____

____

10.- If we (not use)______________________ so much petrol, the world energy supplies would not be going down.

____

____

5) Complete the following using MIGHT to express probability:

1.- If dinosaurs were living on earth now, ________________

____

2.- If men were able to reach Saturn now, ________________

____

3.- If babies understood calculus, ________________

____

4.- If Newton were lecturing in London now, ________________

____

5.- If there were no more oil in the world, ________________

____

6) Supply appropriate conditional clauses for the following statements:

1.- You cannot measure voltages____________________________

____

2.- You will forget this formula,____________________________

____

3.- ____
it is impossible to receive the signal.

4.- ____
it is called "white noise".

5.- ____
our benefits would increase.

6.- ____
we would have to spend less time doing that.

7.- ____
the computer will not accept your instructions.
8.- ____
I will have to take that exam again in September.
9.- ____
it would break.
10.- ____
the engine may stop.
11.- ____
we would be better engineers.
12.- ____
we would be able to find a good job.
13.- ____
I will not have to be back at University in October.
14.- ____
I would take English more seriously.
15.- ____
computers would not be of much use.

7) Explain in some detail what would happen.....

1.- If all traffic lights went out.
2.- If all postmen went on strike.
3.- If the ice on the Poles melted.
4.- If a computer fell in love with a washing machine.
5.- If the Arabs decided not to sell their oil anymore.
6.- If the Soviets invaded Catalunya.
7.- If tobacco consumption were forbidden.
8.- If all radio stations emitted on the same frequency.
9.- If people used helicopters instead of cars.
10.- If cheap home TV stations were sold at any store.
11.- If Martians invaded our planet.
12.- If the world's paper production fell down to zero.

6.I.3 CONDITIONAL SENTENCES TYPE 3: HYPOTHETICAL.

This type of conditional sentence tells us about what might have happened or what might happen now if something had had a different result. They deal with missed opportunities and hypothesis to explain what you cannot fully understand.

e.g. If he **had arrived** earlier, he **would have seen** the experiment.

If I **had added** more water, the mixture **would not have been** so thick.

--Pattern of the basic form:

$$\boxed{\textbf{If + Past Perfect + Perfect Conditional}}$$

--Possible variations of the basic form:
These variations take place only in the main clause.
a) By using modal verbs to express different degrees of probability.

+ probable

If I **had done** A, B **could** / **might** **have been** the result.

- probable

Examples:
-If Newton had lived in our century, he would have made many more discoveries.
-If Fleming had not invented penicilline, many people would have died.

*However, you can have a mixture of Conditional sentences type 2 and 3: (If + Past Perfect + Condit.)
e.g. If Fleming had not invented penicilline, many people would still die.

EXERCISES:

1) Put the verbs in brackets into the correct tenses:

1.- If he (not take)____________________ his gloves off when dealing with that dangerous substance, he (not burn)____________________ his hands.
2.- If he (tell)____________________me earlier, I (give)____________________ him a more suitable book.

3.- He could still be alive today if he (not take)________ ________________ that drug.

4.- There (not be)__________________________ a fire in the lab if those students (be)_______________________ more careful.

5.- If he (patent)_____________________ his invention, he (make)_______________________________ a lot of money.

6.- If the weather (be)_____________________________ good, they (launch)___________________________ the rocket at the right time.

7.- Most engineers (attend)___________________________ the congress, if they (hear)______________________________ about it.

8.- That engineer (refuse)_______________________ to work for that company even if they (offer)_________________ ______________ him twice as much.

9.- We (not know)______________________________ about that Mechanical Engineering magazine if our teacher (not tell)__________________________ us.

10.- If he (be)__________________________ there, he (do)_____ _____________________ something different.

11.- If I (take)_____________________________ English more seriously at University, I (not have)_____________ _________ so many problems with my job some years ago.

12.- If I (know)_________________________ the metro workers were on strike today, I (take)_______________________ a taxi and I (not be)____________________________ late for the exam.

2) Rewrite these sentences using an if- construction:

e.g. *You didn't tell me we were going to run out of petrol, so I didn't go to a petrol station.*

-If you had told me we were going to run out of petrol, I would have gone to a petrol station.

1.- He didn't see the signal telling people not to smoke in the lab, so he smoked there.

____

____

2.- He didn't know how to operate a laser printer, so he didn't use it.

____

____

3.- They didn't listen carefully to the teacher's explanation; perhaps that's why they made that mistake with the chemical mixture.

____

____

4.- We missed our train to Vilanova because we were using an out-of-date timetable.

____

____

5.- He never used computers because he did not know how to operate them.

____

6.II OTHER STRUCTURES TO EXPRESS CONDITIONS AND CONJECTURES.

All these expressions can replace an if-clause:

a) *Affirmative:*

- **provided (that)**
- **on condition that** *Never use "will" after them*
- **as / so long as**

e.g. -You can use the lab **provided** you are careful with those test tubes.

-We will be able to finish the experiment by the end of next week **on condition that** we can use the lab every day.

-There will not be any more progress in scientific research **as long as** the government refuses to spend more money on Education.

b) *Negative:*

- **unless** *(if... not)*
- **only if**
- **otherwise**

PASSIVE

e.g. -**Unless** great care is taken, many mistakes can be made in an experiment.

-Present supplies of organic fuel will be exhausted in a near future **only if** our sources of power are exploited on a wide scale.

PAST.

-I used my pocket calculator, **otherwise** it would have taken me much longer.

CONDITIONAL PERFECT.

c) *Ways of expressing eventuality:*

- **in case / in case of**
- **in the event of**

e.g. -**In case** the measuring instruments were defective, the experiment would be a failure.

-Break that glass window **in the event of** need.
in case of

EXERCISES.

1) Fill in the blanks using one of the expressions seen in section 6.II:

1.- Fossil fuels will soon be exhausted ____________________ alternative sources of energy are found.

2.- Solar energy has to be developed, _______________ there will be a fuel shortage.

3.- You will be able to take books away from the library for the weekend ________________ you give them back on Monday.

4.- When dealing witha dangerous substance, you should wear gloves to avoid being hurt ____________________ accident.

5.- You will be able to take the second part of the English exam in June __________________ you passed the first part in Februry.

6.- The alarm should sound _______________ there is a fire.

7.- I will always be in Vilanova in time for my first class ________________ the trains are not late.

8.- You can use the electronic mail service _________________ you are connected to the network.

9.- ___________________ you are connected to the network, you won't be able to use the electronic mail.

2) Replace the words in italics with an appropriate expression of condition.

1.- You won't be able to keep all that information in the computer *if you don't* register it in the hard disk memory.

2.- Always disconnect the mains supply *if there is* a short circuit.

3.- You can smoke in a room *if* you don't see the signal telling people not to smoke.

4.- You can make a lot of money *if* you patent your invention.

5.- We will not repeat the experiment again *if* he is late.

6.- That engineer will not refuse to work for that company *if* they offer him twice as much.

3) Look at this situation. We do not have precise information, therefore we can only say what we think is likely to happen:

X is a material in a solid form. It is being heated. Will it melt?
--It will probably melt ***provided*** *the temperature is high enough.*

1.- A material is being stretched by a tensile force. Is it likely to break?

2.- A gas is being cooled. Is it possible that it will solidify?

3.- A current is being passed through a wire. Will the wire become very hot?

4.- A material is being held in a flame. The flame is quite hot. Will the material catch fire?

5.- A gas is being compressed. Will it become a liquid?

6.- A battery is connected to a lamp. The battery is fairly powerful. Will the lamp light?

4) Below are some notes which show the possibility or the risk (or even danger) of what might happen in various situations. For example:

*substance heated - possibility of explosion.
-The substance must not be heated, ***otherwise*** *it might / may / could*/would *explode.*

1.- material exposed to water - possibility of corrosion.

2.- transistor wrongly conneced - risk of damage.

3.- high current pass through a wire - risk of overheating.

4.- liquid cooled too quickly - possibility of solidifying.

5.- plastic too near a source of heat - danger of melting.

6.- gas exposed to a naked flame - risk of burning.

7.- container damaged - danger of gas escaping.

8.- material stretched - possibility of undergoing permanent deformation.

5) UNLESS can be rephrased as "if...not" because it is a negative particle (which does not need a negative verb). However, look at the difference in meaning in these two sentences:

*I never shoot people IF they try to stop me.
*I never shoot people UNLESS they try to stop me.

Complete these sentences using either IF or UNLESS.

1.- We'll never prevent those accidents in the lab________ we don't study their causes carefully.
2.- I won't pass my exams____________I study harder.
3.- _______________you don't lend me your book today, I will not be able to read it in time for the exam.
4.- You will get the job_______________you finish your final project before July.
5.- _______________ I have a good dictionary, I won't do this translation for you.
6.- _______________you don't make a special request, they won't lend you that book.
7.- Those students will not work in the Technical Support Centre as scholarship holders_______________they get an increase in their grant.

6) Rephrase the following sentences without changing their meaning using UNLESS, IF (not) and PROVIDED.

1.- If your work doesn't improve, I'm afraid we'll have to sack you.
We'll have to sack you__________________________________

2.- If those students don't pay the rent by Friday, I'm going to throw them out.
I won't throw them out__________________________________

3.- Unless there is nothing else to be discussed, we'll end the meeting.
If____

4.- You'll succeed in the experiment provided you don't make a mistake in the procedure.
Unless____

5.- This gas will not explode unless it is heated strongly.
This gas will not explode provided______________________

7) Read these sentences and rewrite a sentence using IN CASE according to each situation:

e.g. *Thomas is worried about a nuclear war. In fact, he has already built a nuclear shelter for his family.*
--Thomas has built a nuclear shelter ***in case*** */there is a nuclear war.*
/There were

1.- *I want to insure my house. In the event of a fire, it would be of a great help.*

2.- *We might have a puncture. We had better check if we have a spare tyre in our car.*

3.- *He bought some anti-freeze. The temperature may drop below zero.*

4.- *You may not remember the formula, so write it down.*

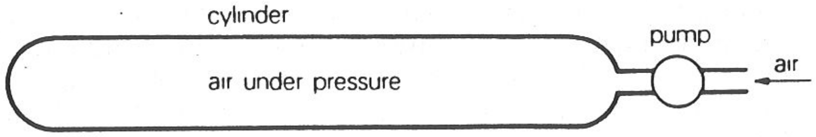
5.- *I gave him a map because I thought he might not know the way.*

6.- *We'll make an early start because there may be a lot of traffic on the road.*

7.- *He may not know about the change in plans, so I'd better warn him.*

8.- *I've packed everything carefully because someone may drop it in the move.*

8) Study this description and then underline the correct answer:



Air is being pumped into a cylinder.The pressure of the air inside the cylinder is getting higher, but the cylinder is not very strong.**(IF / OTHERWISE/ UNLESS)** the pressure is increased, the cylinder will probably fracture.In fact, it is a dangerous state now and it is likely to fracture at any moment **(UNLESS/ IN CASE)** the pressure is reduced.Therefore, reduce the pressure immediately**(IN CASE/ FOR IF/ IN CASE OF)** the cylinder fractures and causes some other important fracture in turn.You will avoid a serious damage to the cylinder, then, **(UNLESS/ IN CASE/ PROVIDED)** you have been listening to what I've been telling you.You don't really seem to be paying attention at all and I do not intend to repeat this explanation again **(PROVIDED/ UNLESS)** you tell me you are about to spoil the whole machine...

UNIT 6: READINGS

1.- Read this text and find answers for these questions:

a) Why do gases exert pressure on their containers?
b) Why can gases change their volume, unlike liquids and solids?
c) What happens when gases are compressed?
d) What happens when gases are heated?

PRESSURE.

Gases are made up of atoms and molecules, which are in constant and rapid motion. The atoms and molecules are constantly hitting the walls of the gas container. In doing so, they exert pressure on the walls.

Gases have no definite shape or volume. The shape and volume of a gas depend on its container. Compared with solids, and liquids, the molecules of a gas are relatively far apart. Hence, they can be compressed, or forced into a smaller space. But if the volume of a gas is decreased, its pressure increases, because the molecules hit the walls more often and more rapidly. Thus, pressure is in inverse proportion to volume.

A liquid, on the other hand, cannot be compressed. If we try to force a liquid into a smaller space, it seeks a way out of the container. The pressure which a liquid exerts on the walls of a container is equal in all directions. This is why liquids are used for transmitting power in different directions, in hydraulic brakes and lifts.

The more a gas is compressed, the greater its resistance to compression. If a large amount of gas is forced into a small space, it becomes difficult to compress further. Under very high pressure, compressed gas can be used for transmitting power.

As gas pressure is increased, the molecules are forced closer together. If this continues, the molecules eventually become attached to one another. At this point, the gas changes into a liquid.

The pressure of a gas varies with temperature. Pressure is in direct proportion to absolute temperature, since the higher the temperature, the more rapid the motion of the molecules, and consequently the greater the pressure exerted on the walls of the container. Conversely, the higher the pressure of a gas, the higher its temperature. When a gas is compressed, it becomes hotter.

2.- Say whether these relationships are direct or inverse. Then put them in the order in which they occur in the passage.

a) compression of a gas: resistance to further compression
b) change in volume: change in pressure
c) compression of a gas: increase in temperature.
d) distance between molecules: compressibility of substances
e) change in temparature: change in pressure.

UNIT 6: READINGS

1.- Read the text and choose the most suitable title:

The function of carbon dioxide in the atmosphere
The future of man
Possible effects of technology on the environment
The control of temperature in the environment

Every year there are changes in the climate in different parts of the world. Some of these changes are due to natural causes. However, some climatic changes are caused by air pollution and these changes may increase. One kind of pollution results from burning oil and coal in transport and in factories.

If the pollution affects the level of carbon dioxide in the atmosphere, the results are likely to be serious. Carbon dioxide constitutes only a small part of the atmosphere. But it has an important function in maintaining the balance between radiation from the sun entering the atmosphere and radiation leaving the Earth. Some of the radiation is absorbed by the Earth and some is radiated back into the atmosphere. The carbon dioxide in the atmosphere prevents some of the radiation from leaving the atmosphere. Therefore, the heat remains in the atmosphere and carbon dioxide helps to prevent the temperature of the Earth from falling.

If the proportion of carbon dioxide in the atmosphere is increased as a result of air pollution, the temperature of the atmosphere may rise. This might eventually cause the ice in the north and the south poles to melt. If this happened, the sea level would rise and parts of the Earth would be flooded. The likelihood of this happening is remote, but the possibility exists.

There is also a fairly strong possibility that the dust level in the atmosphere will rise as a result of industrial pollution. This dust pollution will reflect sunlight back into space. If this happens, less sunlight will reach the Earth and the temperature will fall.

Another danger comes from the destruction of the Earth's vegetation, such as the forests of Brazil, which are being cleared to make way for farmland and cities. Trees use carbon dioxide and their destruction may upset the balance of carbon dioxide in the atmosphere.

2.- Look at these notes on possible future events and their effects. Using information from the passage, discuss whether they are certain, probable, possible or unlikely. Then put them in the order in which they occur in the passage.

a) temperature of atmosphere↑ → polar ice↓
b) new cities and farmland → destruction of vegetation
c) air pollution↑ → level of CO_2 in atmosphere↑
d) air pollution → climatic changes
e) destruction of vegetation → balance of CO_2 upset
f) industrial pollution↑ → dust in atmosphere↑
g) CO_2↑ → level of radiation↑
h) polar ice↓ → sea level↑
i) burning oil and coal → air pollution↑
j) dust in atmosphere↑ → sunlight reflected back
k) sunlight reflected back → earth's temperature↓
l) level of radiation↑ → temperature of atmosphere↑
m) sea level↑ → parts of earth flooded

UNIT 6: READINGS.

1.- Read this text and answer the questions below:

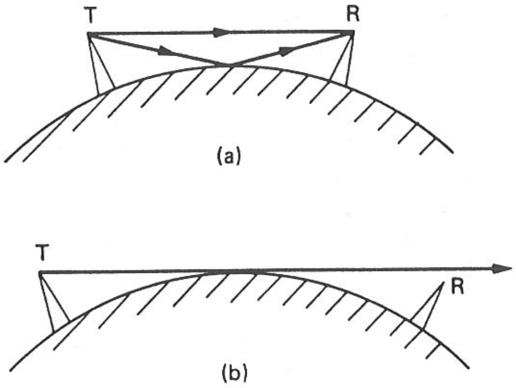
PROPAGATION

If a direct line can be drawn between a transmitter and a receiver situated on the earth's surface, then a signal will be received. In addition to this direct wave there can exist a reflected wave arriving at the receiver after reflection from the earth's surface. These make up the **space wave**, i.e.

space wave = (direct + ground reflected) wave

However, if the separation between transmitter and receiver is such that the curvature of the earth precludes line of sight, then no space wave is received. Nevertheless, propagation is still possible beyond the horizon due to two important means which are respectively **surface wave** and **sky wave**. The surface wave is produced by energy travelling close to the ground and guided by it to follow the curvature of the earth in the same way an electromagnetic wave is guided by a transmission line. This is the phenomenon of diffraction.

FIG. 1. Ray paths over a curved earth (a) within optical horizon, (b) beyond optical horizon.



The direct, reflected and surface (or diffracted) wave may all be present together, and it is not always necessary to separate them. The combination is known as the **ground wave**.

ground wave = surface wave + space wave

The sky (or ionospheric) wave, as can be seen from Fig. 2, is dependent upon the waves propagating in an upward direction being bent in an electrically charged layer in the upper atmosphere, called the ionosphere, and reflected back towards the earth. The ionosphere extends roughly from 100 to 400 km above the earth's surface.

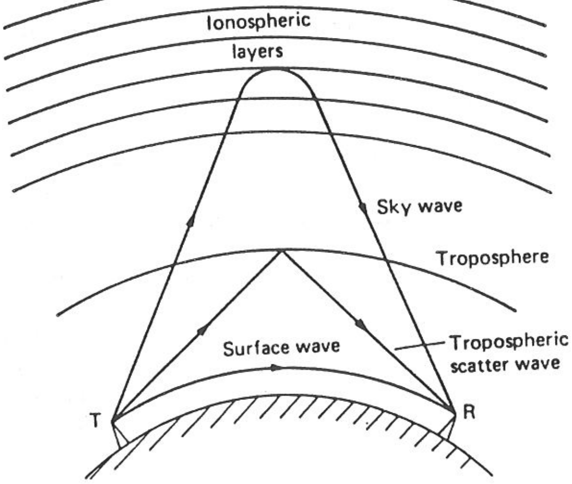


FIG. 2. Beyond-the-horizon propagation.

There is also another form of propagation: beyond-the horizon, which is becoming of comparable importance to the sky wave in some communication links. This is called **scatter wave** and results in the reflection of waves due to turbulent changes in the troposphere.

2.- How many types of wave are described?
a) 2 b) 5 c) 10

3.- Complete the sentences:
a) A wave reflected from the earth's surface is______________.
b) Energy travelling close to the ground produces a__________
_______________.
c) The ground wave is_______________________.
d) The_______________ is reflected by the ionosphere.
e) A wave reflected by turbulence in the troposphere is______
________________.

4.- Match each of the words from the text with the word or phrase closest in meaning.

1.- situated
2.- direct
3.- exist
4.- separation
5.- precludes
6.- beyond
7.- bent
8.- comparable
9.- turbulent
10.- extend

(a) straight
(b) rough
(c) placed
(d) stretch
(e) similar
(f) over
(g) curved
(h) makes impossible
(i) be
(j) distance

5.- Answer by completing the sentence:
1) What does the space wave consist of?
The space wave____.
2) If a straight line can be drawn between a transmitter and a receiver, what is the term used?
Transmitter and receiver are_____________________________.
3) If a straight line can be drawn between a trasnmitter and a receiver, will a space wave be received?
A____.
4) If the receiver is beyond the horizon, will a space wave be received?
If the receiver____.
5) Is propagation possible if two stations are not in line of sight? By what means?
Propagation_______________by means of__________________.

6.- Form a paragraph by putting together your answers as follows:

$\boxed{1}$. If $\boxed{2}$, $\boxed{3}$. $\boxed{4}$; however, $\boxed{5}$

UNIT 6: LISTENING.

VCR Recording

1 Listening

TAPESCRIPT

SWITCHBOARD: Video and Computer Centre. Good afternoon.

CUSTOMER: Good afternoon. Could I speak to one of your technical staff, please?

SWITCHBOARD: For video or computers, sir?

CUSTOMER: Video, please.

SWITCHBOARD: One moment, please.

TECHNICAL ASSISTANT: Hello. Can I help?

CUSTOMER: Yes . . . I bought a Tanuyi video cassette recorder from you earlier today, but when I got home I found that the instructions were missing. Well, I've managed to connect the machine to my TV, but I've __________ for one hour to set it up for unattended recording. But I just can't figure it out.

TECHNICAL ASSISTANT: OK. What did you do first?

CUSTOMER: First I pressed STANDBY.

TECHNICAL ASSISTANT: I see. Well, first of all, you shouldn't have pressed STANDBY; you should have pressed TIMER. If you __________ TIMER, you would have ____ the message BLOCK 1 on the VCR display.

CUSTOMER: I see. So first I should have pressed TIMER.

TECHNICAL ASSISTANT: Yes, that's right. And then you ____________________ it again.

CUSTOMER: You mean I oughtn't to have pressed STANDBY at all?

TECHNICAL ASSISTANT: That's right, sir. As I was saying, you should have pressed TIMER again. If you had pressed it a second time, you would have seen START on the VCR display. And then you __________________ the starting time of the programme you wanted to record.

CUSTOMER: Yes, I see.

TECHNICAL ASSISTANT: Then you ought to have pressed TIMER a third time . . . and you would have seen STOP on the VCR display. Then you could have selected the finishing time of the __________.

CUSTOMER: Uh-huh.

TECHNICAL ASSISTANT: And if you had pressed TIMER a fourth time, you would have seen PROG (meaning Program) on the VCR display. Then you could have selected the TV channel ______________ you wanted to record.

CUSTOMER: So I should have pressed TIMER four times?

TECHNICAL ASSISTANT: No, sir. You should have pressed it five times. If you had pressed it one more time, you would have seen the actual time and BLOCK 1 on the VCR display . . . and it would have been set up. It's all very simple really.

CUSTOMER: OK, I see. But it would have been much easier if I ________ the instruction manual.

UNIT 7.

7.- COMPOUND NOUNS.

Compound nouns are one of the most outstanding features of scientific and technical writing. They can be found in *classifications, instructions, definitions, descriptions,* etc. The reason why they occur so frequently in technical writing is because they make **the statements more concise,** therefore expressing a great deal of information with just a few words. The more specialized the text and the subject, the longer and more frequent they are.

7.I THE STRUCTURE OF COMPOUND NOUNS.

They are shortened forms that, in the case of technical English, have developed from prepositional phrases, verbs phrases and relative clauses. Consequently, this structure is used for CONCISENESS: the compound noun is shorter than the phrases and clauses from which it has developed.

ex: a cargo ship

-Prep. Phrase: a ship for carrying cargo.
-Verb Phrase: a ship used for carrying cargo.
-Relat. Clause: a ship which carries cargo.

7.I.1 STRUCTURAL PATTERNS.

·Compound nouns consist of a number of modifiers that can be mainly NOUNS, ADJECTIVES, VERBS (-ing /-ed) and ADVERBS (ranked according to their frequence of occurrence).

·All these modifiers act as adjectives for the final noun or HEADNOUN, therefore being placed before the headnoun.

PATTERNS:

1 / 2 / 3 / 4 / 5 MODIFIERS + HEADNOUN

Only in extremely rare cases has a compound noun more than five modifiers.

EXAMPLES:
(1) a car factory
(2) a liquid storage vessel
(3) a low voltage distribution system
(4) a long-term surveillance test planning
(5) water turbine carbon gland ring assemblies

·As a rule, the **direction of interpretation** with simple compound nouns starts from the headnoun and then leftwards, that is, **reversing the order of words.**

ex: a water purification system
(a system for the purification of water)

7.I.2 THE USE OF SINGULAR AND PLURAL IN THE COMPOUND.

·Plural nouns become *SINGULAR* when they become modifiers in the compound noun.

·Only the headnoun can take the *PLURAL* form.

ex: an electron beam (a beam of electrons)
a battery car (a car driven with batteries)
a liquid storage vessel (a vessel for the storage of liquids)

ex: semiconductor devices (devices using semiconductors)

7.I.3 STRUCTURES FROM WHICH THE COMPOUND IS DERIVED.

The structures that most commonly occur in the sentences used to decode the meaning of nominals compounds are:

1.- PREPOSITIONAL PHRASES:

⊕ of, for, in, with, on, from, to, by (by means of) ⊖

ex: pipe installation (the installation of pipes)

a water well (a well for water)

a fuel injection pump (a pump for the injection of fuel)

impact resistance (resistance to impact)

2.- VERB PHRASES:

-ing / -ed

ex:		
ex:	semiconductor devices	(devices using semiconductors)
	research engineer	(an engineer engaged in research)

3.- RELATIVE CLAUSES:

who / which / that... in which / for which...

Derivational value of Prep. Phrases and Verb Phrases.

ex:	a water well	(a well that is used for water)
	semiconductor devices	(devices that use semiconductors)
	pressure gauge	(a gauge in which presssure is indicated)

7.II CLASSIFICATION OF NOMINAL COMPOUNDS.

TYPE 1.- Two or more nouns bound together with multiple different purposes:

ex: glass industry (an industry engaged in the production of glass products)

glass insulator (an insulator made of glass)

TYPE 2.- The headnoun is the performer of the action (-er / -or).

ex: computer designer (person who designs computers)

radio operator (person who operates the radio)

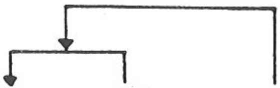
smoke extractor (a device which extracts smoke)

air heater (a device which heats air)

D.O. V

TYPE 3.- Noun modifier + Present Part. (-ing) + HEADNOUN:
Adjective

ex: speed-controlling mechanism (a mechanism which controls speed)
long-lasting battery (a battery that can last for a long time)



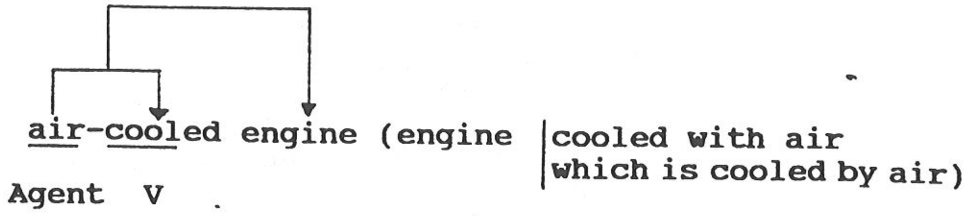
air-cooling engine (an engine which cools air)

D.O. V

TYPE 4.- Noun modifier + Past Participle (-ed) + HEADNOUN:

ex: wind-driven pump (a pump driven by wind)

hand-made piece (a piece made by hand)



air-cooled engine (engine | cooled with air
which is cooled by air)

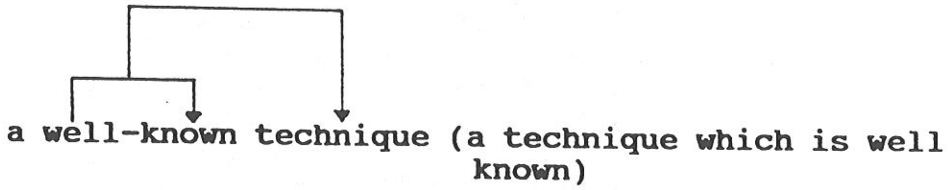
Agent V

TYPE 5.- Adverb + Past Participle (-ed) + HEADNOUN:
Present Participle (-ing)

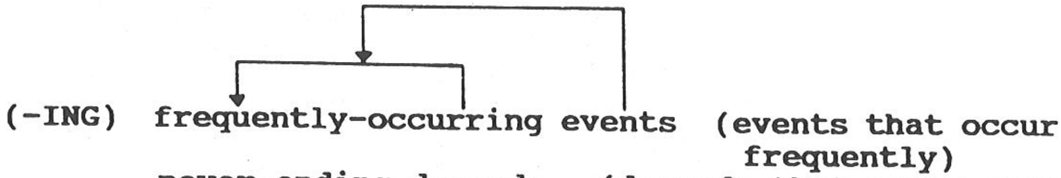
ex:

(-ED) widely-used substance (a substance that is used widely)

fully-developed program (a program which has been fully developed)



a well-known technique (a technique which is well known)



(-ING) frequently-occurring events (events that occur frequently)

never-ending demands (demands that never end)

EXERCISES:

1.- Answer these questions:

1) What is a battery car?
2) What is a gas mask?
3) What is a communication satellite?
4) What is a steam train?
5) What is an oil well?
6) What is a smoke cloud?
7) What does magnetic bubble memory mean?
8) Can you work as a worker factory?
9) Is it possible to eat a chicken farm?
10) Is it usual to build a wall around a farm chicken?
11) Can you ride a race horse?
12) Can you walk across a garden flower?
13) Is it possible to drive a car battery?

2.- Answer these questions:

1) What is a circuit designer?
2) What is a radio operator?
3) What is a factory worker?
4) What is a computer programmer?
5) What does a ship builder do?
6) What does a bottle opener do?
7) What does a coffee grinder do?
8) Rubik's cube is called a mind bender. Why?

3.- Answer these questions:

1) What is a time-saving technique?
2) What is a sound-recording instrument?
3) What is a ship-owning family?
4) What is a fast-moving vehicle?
5) What is a long-lasting lithium battery?
6) What is an oil-producing country?
7) What are message-coding rules?
8) What are file-programming considerations?
9) What is a self-checking code?
10) What is a disk-operating system?
11) What is a hard-working student?
12) What do man-eating tribes eat?
13) What does a ship-building company do?
14) What do light-emitting diodes do?
15) What kind of company is one which makes paper?
16) What kind of country is one which produces musical equipment?

4.- Answer these questions:

1) What is a radio-controlled aircraft?
2) What are man-made fibres?
3) What are factory-made pieces?
4) What is a gas-powered engine?
4) What is a hand-made pipe?
5) What is a London-made pipe?
6) What is a home-made chair?
7) What is a circuit-switched network?
8) What is a remotely-operated special equipment?
9) What is an H-shaped building?
10) Who supplies a state-supplied service?
11) How is a water-cooled car engine cooled?

5.- Make compounds from the following phrases.

1) an engine driven by petrol.
2) a wall made of bricks.
3) the production in the world.
4) a brake operated by hand.
5) an engine which has pistons.
6) a platform for a camera.
7) a car driven by batteries.
8) the regulation of voltage.
9) a radio for a car.
10) the flow of current.
11) en engineer engaged in research.
12) the terminals of a generator.
13) a building shaped like an H.
14) an industry engaged in the production of paper.
15) an insulator made of glass.
16) alloys made of nickel.
17) a chamber for the combustion of fuel.
18) a gear shaped like a worm.
19) the system of refrigeration.

7.II.1 SOME CONFUSING PAIRS.

Be careful with examples like:

a paper filter / **a filter paper**
(a filter for paper) (paper operating as a filter)

an air-cooled device / **an air-cooling device**
(a device [which is] cooled by air) (a device | used for cooling air
| which cools air

a video-recorded practice / **a video-recording practice**
(a practice [which is] recorded on a video) (a practice on the recording of videos)

6.- What is the difference between...?

1) well water and a water well
2) a radio car and a car radio
3) a communication satellite and satellite communication
4) a paper filter and a filter paper
5) a wall brick and a brick wall
6) a horse race and a race horse
7) a glass bottle and a bottle glass
8) oil fuel and fuel oil
9) modulation frequency and frequency modulation
10) gas fuel and fuel gas
11) a water-cooled engine and a water-cooling engine

7.III THE USE OF HYPHENS.

**Nouns and Compounds: three different forms:*

a) ***solid***	*b)* ***hyphenated***	*c)* ***open***
a lamppost	a lamp-post	a lamp post

◄--

progression

**No clear rules about hyphenated or open forms------------>DICTIONARY*

**The following points may help about the use of hyphens:*

1) In Compound adjectives (-ed / -ing):

ex: man-made fibres / a long-lasting battery

2) A group of words used as an adjective before a noun:

ex:

a note of ten pounds-------------> a ten-pound note

a circuit which has two wires----> a two-wire circuit

a compound of three words------>a three-word compound

3) To avoid ambiguity:

ex:

an old-computer distributor /
an old computer-distributor

ten-foot long pieces / ten foot-long pieces

EXERCISES.

1.- What is the difference bewteen....?

1) an electric-piano player and an electric piano-player
2) an old-record collector and an old record-collector
3) a criminal-law student and a criminal law-student
4) a short-film director and a short film-director
5) an air-cooled device and an air-cooling device
6) a video-recorded practice and a video-recording practice

2.- Replace the italized phrases by compound nouns:

1) The Industrial Revolution led to a radical change in *methods of production.*

2) Nuclear energy has been used by some of the latest plants for *the supply of electric power.*

3) *The mechanics of fluids* is a specialized branch of physics.

4) *The facility for electric power that is made of concrete* was seriously damaged by the earthquake.

5) The company announced that it would end *its program of research into supercapacity computers.*

6) Gas is one of the by-products of *the industry concerned with the refining of oil.*

3.- What is....? Remember to be careful about plurals and hyphens.

1) a wire made of copper
2) a needle of a compass
3) a vehicle which moves slowly
4) a bar which is rigidly fixed
5) a diagram of a circuit
6) a vase painted by hand
7) a firm which owns ships
8) a rate that is always changing (use "ever")
9) velocity which increases rapidly
10) a signal modulated by frequency
11) a country which has a high income
12) a circuit which has three wires
13) a lamp with a filament of tungsten
14) emission in an electric field
15) a tube in which vacuum has been created

16) a dielectric composed of air
17) inductors wih a core of air
18) a generator driven by a diesel engine
19) a vehicle which has four wheels
20) a woman who speaks on the radio
21) a theory about the waves of earthquakes
22) a textbook about the analysis of vectors.
23) Chemistry of the nucleus of cells
24) Measurements of the transfer of heat
25) Interpretation of photographs taken by X-rays
26) an indicator for measuring the speed of air
27) devices for the control of the flow of heat
28) the production of machinery for industry
29) a machine which bottles wine and is operated manually
30) a figure which has three sides
31) a complex which contains copper and ammonia
32) a reaction induced by drugs
33) a highway which is 500 kilometres long

4.- Complete the following definition of each compound noun:

1) Long-term memory improvement techniques.
Techniques for____________ of____________ memory.

2) Cancer-causing ultraviolet wave exposure.
Exposure by____________ of____________ light which can cause____________.

3) Recently-invented transistorized alarm systems.
____________ of alarms which have been recently ____________ and which use ____________.

4) Car engine exhaust systems.
Systems of ____________ for____________ of cars.

5) Drug-related social behaviour problems.
Problems of________________ which are____________ to____________.

6) Improved computer-virus detection techniques.
Improved____________ for____________ of____________ in____________.

7) High-performance integrated circuits.
Integrated________________ of________________.

8) Electrical-interference background noise distortion.
Distortion of____________________ due to____________ ________________.

5.- **Rewrite these passages and make them more concise by changing the words or phrases in italics into compound nouns:**

The cars which are used in rallies like the Safari or the Monte Carlo look the same as ordinary *cars which have been bought from a garage*. In fact, they are not the same; they are *cars which have been specially prepared*. Firstly, only *components which have been rigorously tested* are used. Secondly, *the components which are chosen* are put together much more carefully. In other words, *the cars which are driven in rallies* are in effect *cars that have been built by hand*.

The box for tools, which is made of steel, is kept in *the room for stores*. In addition to the standard tools, it should contain *a ruler for measuring* up to 12 inches, some *wire made of copper*, some *nails 10 centimetres long*, a number of *plugs with two pins*, some *wire for fuses* and *a can containing oil*. If any tools are missing, *the manager of the workshop* should be told.

BROADCASTING

Three major allocation issues involving the broadcasting and *the services of broadcasting by means of a satellite* will be discussed at the 1992 World Administrative Radio Conference (WARC-92): the expansion of frequencies for conventional *broadcasting at high frequencies*; new frequencies for both satellite and terrestrial digital audio broadcasting to *receivers which are held by hand*; and new frequencies for *the broadcasting of television of high definition* from satellites.

Expanding the existing high-frequency (HF) allocation in the range of 5950-26100 kHz is intended to end the persistent shortage of spectrum allocated exclusively to the domestic and international *broadcasting of radio on short wave*. Exclusive bands are needed because, given the *atmospheric problems of propagation* and interference in that range, the *transmitters which have a high power* required for a reasonably reliable service to portable receivers make it difficult for broadcasters to share the same frequencies with other services having HF allocations. Those other services include the fixed service (for *communications from point to point*), the mobile services (aeronautical, land, and maritime), the amateur services, the standard frequency and the *services for the signal of time*, and the frequencies reserved for *observations of astronomy by means of a radio*.

(source: *IEEE SPECTRUM FEBRUARY 1992*, p 24)

6.- Identify the 18 different noun compounds in the following text, classify them according to the number of modifiers they have (two-word / three-word / four-word compounds, etc) and explain their meaning:

THE CATHODE RAY TUBE

The cathode ray tube (crt) is used in oscilloscopes, radar receivers and television sets. The type described here is that used in oscilloscopes. By means of a crt, an oscilloscope not only shows the signal size, but also how the signal varies with time. In other words, it shows the signal waveform.

The crt operates as follows. First electrons are emitted from a heated cathode. Then these electrons are accelerated to give them a high velocity. Next they are formed into a vertically-horizontally-deflecting beam. Finally they are made to strike an inner-surface coated screen with a phosphor.

The crt comprises an electron gun and a deflection system in a glass tube with a phosphor coated screen. The electron gun forms the electrons into a beam. It contains an electron-stream producer heated cathode. On the same axis as the cathode is a cylinder known as the grid. By varying the negative potential on the grid, the beam intensity can be varied. A three-anode system follows. These accelerate the beam and also operate as a lens to focus the beam on a screen as a small dot. Varying the potential on the central anode, a2, allows the focus to be adjusted.

On leaving the electron gun, the beam passes through two sets of plates wich are at right angles to each other. The first set of plates are the Y plates. As these are nearer the anodes, they have a greater effect on the beam. Therefore the signal is applied to this set. They control the vertical deflection of the beam. The second set are the X plates. On an oscilloscope the output from a timebase oscillator is applied across the plates as a means of moving the beam horizontally at regular intervals. Hence the horizontal axis of an oscilloscope is the time axis. By means of the deflection system, then, the beam can be made to traverse the screen both horizontally and vertically.

The final element is the phosphor coated screen. When the electron beam strikes the screen, the phosphor coating fluoresces. Various colours of light are produced depending on the phosphor used.

(source: Glendinning, E.H., *English in Electrical Engineering and Electronics, pp. 40-41)*

7.- Select a word from the three alternatives given which is most similar in meaning to the word in italics as it is used in the text:

1) *emitted* (line 6)

- a) scattered
- b) given off
- c) absorbed

2) *deflecting* (line 8)

- a) moving
- b) bending
- c) changing

3) *intensity* (line 15)

- a) focus
- b) brightness
- c) shape

4) *adjusted* (line 18)

- a) reduced
- b) varied
- c) increased

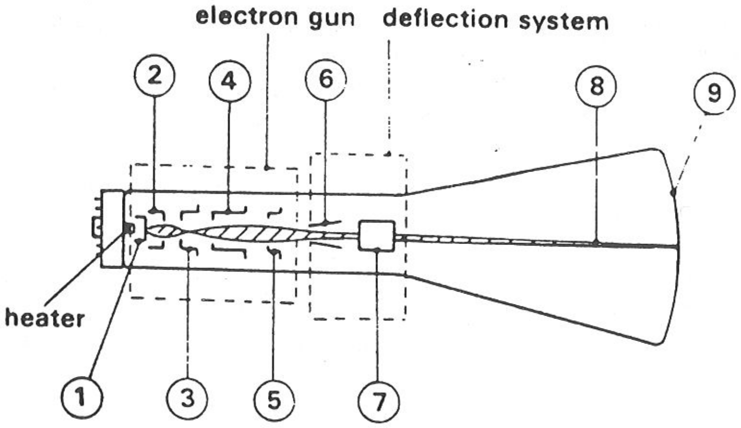
5) *regular* (line 25)

- a) frequent
- b) equally timed
- c) varying

6) *fluoresces* (line 30)

- a) lights
- b) emits electrons
- c) turns green

8.- Complete the labelling of this diagram of a cathode ray tube using the information in the passage:



9.- Answer these questions about the passage:

1) Why is an oscilloscope better than a meter?
2) What is the source of electrons for the electron beam?
3) What is the function of the electron gun?
4) How is the intensity of the beam controlled?
5) In what way is the system of anodes like a lens?
6) Why is the signal applied to the Y plates?
7) What does the timebase do?
8) Why is the horizontal axis of an oscilloscope the time axis?

10.- Look for six examples of different types of noun compounds in a magazine or a technical textbook and explain their meaning.

UNIT 8.

MULTI-WORD VERBS

8.I DEFINITION.

A multi-word verb is a **verb followed by one or two particles (prepositions or adverbs)** whose meaning sometimes cannot be predicted from the meanings of the verb and particles in isolation.

e.g. break apart, come after, cut up, pull over,
look after....

·Multi-word verbs are important because they are **very common** and because **they provide many common and useful nouns and adjectives in everyday use** (e.g. hand-out, breakthrough, outcome, input, output, feedback, outlay...).

·Very often, there is a verb of **CLASSICAL ORIGIN** corresponding to the multi-word verb. This is much more formal:

e.g. give up----------> abandon
carry out--------> conduct
carry on with----> continue

8.I.1 MOST COMMON VERBS AND PARTICLES USED IN MULTI-WORD VERBS.

VERBS:

be, break, bring, call carry, catch, come, cut, do, draw, drop, fall, get, give, go, hold, keep, lay, let, look, make, pass, pull, put, run, see, send, set, stand, take, turn, work.

PARTICLES:

about, above, across, after, against, along, apart, around, aside, at, away, back, by, down, for, forward(s), from, in, into, like, off, on, out, over, past, round, through, to, under, up, with, without.

After, against, at, for, from, into, like, to, with and without* are only **prepositions.

Away, back, forward* and *out* are only **adverbs.

The others may function either as prepositions or as adverbs.

8.I.2. THE MEANING OF PHRASAL VERBS.

A **Phrasal Verb** (Verb + Prep./Adverb) can have more than one meaning:

a) *IDIOMATIC*---> The phrasal verb has a special meaning which cannot be guessed from the meaning of the separate words. Some phrasal verbs have several idiomatic meanings, depending on the words that accompany them.

e.g. TO TAKE OFF

The aircraft took off *(left the ground)*
The thief took off *(ran away in a hurry)*
The new product took off *(began to improve, made a big profit)*

b) *NON-IDIOMATIC*---> When the meaning of the phrasal verb can be guessed easily because it is a combination of both the verb and the preposition or adverb.

e.g. TO FALL DOWN

The temperature fell down to zero.
The teacher fell down and broke his leg.

8.I.3. THE STRUCTURE OF MULTI-WORD VERBS.

The basic compounds are:

- VERB + PREPOSITION
  + ADVERB (Transitive / Intransitive)

e.g. *I'm looking for my book.* (Prep./Tr.)
e.g. *The plane took off at ten o'clock.* (Int.)
e.g. *They carried out an important experiment.* (Adv./Tr.)
e.g. *The accident came about due to a short circuit.* (Adv./Int.)

- VERB + ADVERB + PREPOSITION (Transitive)

e.g. *The teacher told us to carry on with the experiment.* (Tr.)
e.g. *He tried to get away with it.* (Tr.)

*We differenciate between transitive and intransitive verbs **when the particle is an adverb,** because word order is affected.

-If the verb is **transitive** (usually with *UP, DOWN, IN, OUT, AWAY, OFF, ON*), the direct object usually comes after the particle. But, if the particle is an adverb, it may come between the verb and the particle or after the particle, that is, it can have two positions.

Thus, the sentence "Turn off the radio" may be said in two ways:

TURN OFF THE RADIO!
TURN THE RADIO **OFF**!

Furthermore, if the D.O. is a **pronoun,** there is **only one position: between the verb and the particle:**

TURN IT **OFF!**

Another example: He took off his coat / He took his coat off.

But: He took it off.

EXERCISES.

1.- Read the following sentences and substitute the noun objects by **pronoun objects.** Remember to **place them between the verb and the particle when necessary.**

1.- Look up that word in the dictionary.

____

2.- A British engineer is carrying out a research on Fluid Mechanics.

____

3.- They are cutting down the Amazon forest.

____

4.- Do not forget to switch off the computer before you leave.

____

5.- I am fed up with all these delays!

____

6.- The government turned down the unionists' proposal.

____

7.- Most doctors advise people to give up smoking.

____

8.- Turn on the radio, there is an interesting program on new materials.

____

9.- The car ran out of petrol and we had to stop and wait until somebody came and helped us.

____

10.- The Press has hit out at the Government.

____

11.- This report bears out my theory. (confirm)

____

12.- The wind blew out the candle. (extinguish)

____

13.- They blew up the bridges during the war. (destroy by explosion)

____

14.- The firemen had to break down the door to get into the burning house. (cause to collapse)

____

15.- Divorce breaks up many families.

____

16.- I called up Tom to tell him about the exams. (telephone)

____

17.- They carried out their experiment successfully.

____

18.- Could you clear away these papers?. (remove)

____

19.- Trade was so bad that many big shops closed down some of their branches. (shut permanently)

____

20.- The company has cut off our electricity supply because we haven't paid the bill.

____

21.- The government should do away with the regulations restricting drinking hours. (abolish)

____

22.- Our teacher drew up the circuit on the blackboard and we could understand his class. (make a plan)

____

23.- I'm fed up with this wet weather. (be bored)

____

24.- I had to fill in three forms to get my new passport.

____

25.- In the end I found out what was wrong with my hi-fi.

____

26.- Some people live abroad to get out of paying heavy taxes. (free oneself from an obligation)

____

27.- I must call the librarian to give back this book.

____

28.- A really determined person never gives up trying. (abandon)

____

29.- He went back on his promise. (break)

____

30.- As we drove through the city, the guide pointed out the most important buildings.

____

31.- We had to put up with a lot of noise while we were in the lab because there were some men working in the garden. (bear patiently)

____

*Now see how all this changes with phrasal verbs whose particle is a preposition:

e.g. He doesn't care for films about the war. (like)
THEM

Do the same with these examples:

1.- The professor said that he was interested only in research; he didn't care about students. (be indifferent to)

2.- He got through his exam all right. (finish successfully)

3.- There is a mistake here. We'll have to go through the calculations and find the error. (examine)

4.- He is against apartheid.

5.- I'm looking for a job.

6.- You'll have to look after your brother for a while.

2.- Fill in the blanks using the following phrsal verbs:

(T) CUT DOWN
PICK UP
LIFT UP
PUSH OFF

(I) STAND UP
JUMP IN
GO OUT
LOOK UP
JUMP ON

1.- He was tired of sitting, so he__________ ________.
2.- When the bus came to a halt, we__________ ________.
3.- When Professor Smith dropped his papers, I helped him to ___________ them ______.
4.- The men with the axes are going to__________ the trees _____.
5.- The boys ran to the edge of the swimming pool and____________ _______.
6.- The cat was sleeping on the table and I had to work, so I had to___________ it ______.
7.- The porters___________ the equipment ______ and carried it into the laboratory.
8.- He___________ _____ in surprise when she came in.
9.- The doctor has_________ _____ to attend a patient.

3.- Exchange the verbs in the list for those in the sentences.

GO AWAY
PUT OFF

FALL DOWN
PULL DOWN

RUN OFF

1.- The people slowly departed.
2.- The old building collapsed.
3.- The workmen demolished the factory.
4.- The committee want to delay the decision.
5.- The banker decamped with his clients' money.

CUT DOWN
CUT OUT
COME OUT
PICK OUT
EAT UP

6.- Lots of new software packages appear every month.
7.- Oil consumption was drastically reduced in 1973.
8.- Select the right components and assemble them.
9.- The furnace consumes coal at a rate of 3 tons per hour.
10.- The surgeon quickly excised the tumor.

4.- Look at the following sentences and substitute the multi-word verb by one of these verbs, changing their form if necessary:-

POSTPONE
SOLVE
REDUCE
REMOVE
DEFEND
CONTINUE
ABANDON
OMIT
CONDUCT
INTERRUPT
RETURN

1.- Try to work that problem out for yourself.

____

2.- A pupil took the samples back to the lab.

____

3.- After having studied for four years, he gave up engineering.

____

4.- I shall never take off this ring you gave me until I die.

____

5.- Be careful not to leave out any useful information.

____

6.- People should try to cut down on the consumption of fuel.

____

7.- All over the world, scientists are carrying out research on environmental pollution.

____

8.- Although many people were against it, the lab staff carried on with the chemical experiment.

____

9.- Stand up for what you believe in.

____

10.- The demonstrators broke in on the class and we had to hold over the lecture.

____

5.- Exchange the verbs in the list for those in the sentences:

ENTER
DESCEND
INCREASE
DECREASE
DECELERATE
ACCELERATE

1.- The lift went down to the ground floor.
2.- The doors opened and people came in.
3.- The prices of many items went up last year.
4.- Some of the prices may come down this year.
5.- The car slowed down before reaching the corner.
6.- The police car speeded up in pursuit of the robbers.

CORRODE
ABSORB
COLLAPSE
REMOVE
EMIT

7.- The generator has broken down twice this week.

8.- Acid has eaten away a section of the protection layer; now it must be taken away.

9.- Plants take carbon dioxide in and give oxygen off.

6.- Fill in the blanks using the appropriate "Latin" verbs and then exchange them for the corresponding Phrasal verbs:

SEPARATE
DEPRESS
REJECT
INSERT
ESTABLISH

SET UP
PUSH DOWN
PUSH IN
TURN DOWN
CUT OFF

1.- ______________ the coin and _____________ the lever; then dial the number.

2.- Element A is now_________________ from the rest of the system.

3.- Dr. Smith's proposal was __________________ by the committee.

4.- We are going to ____________________ a new assembly plant in the South sector.

RETAIN
ERECT
DISCOVER
INVENT
ENLARGE

FIND OUT
BLOW UP
THINK UP
PUT UP
KEEP IN

5.- All the microphotographs are being ________________ at the lab.

6.- After a careful survey of the soil, they ________________ that the drainage was irregular.

7.- The old method was unreliable, so we had to ________________ a new one.

8.- The plastic insulating cover ________________ heat.

9.- Last year they cut all the trees down and ________________ a nuke.

8.II NOMINALIZED FORMS.

They are *NOUNS* **derived from Phrasal verbs**. Some phrasal verbs have their own nominalized forms which are very widely used in Technical texts, such as "a breakdown" or "a mix-up". Other phrasal verbs do not have a nominalized form.

*Most nominalized forms have the structure *verb + particle:*

TO BREAK DOWN --------------> A BREAKDOWN
TO BREAK IN-----------------> A BREAK-IN
TO MIX (something) UP-------> A MIX-UP

*Only a few nominalized forms have the structure *particle + verb:*

TO COME OUT-----------------> AN OUTCOME
TO LAY OUT------------------> OUTLAY
TO KEEP UP------------------> UPKEEP

Many nominalized forms can be written with or without a *HYPHEN (-)*. It is often a matter of established usage or of personal choice, although it is always advisable to look them up in a *good dictionary*. However, nominalized forms of the "particle+verb" type do not take a hyphen.

e.g. UPKEEP
OUTLAY

Where a PLURAL is possible, that is, when the nominalized form is countable, it is formed in the usual way with the addition of -s.

e.g. BREAKDOWNS
BREAK-INS
OUTCOMES

*However, you can also have some forms derived from a phrasal verb which are not nouns but **ADJECTIVES**.

e.g. TO STAND OUT---------> OUTSTANDING

"This is one of the most outstanding features of our new printer"

EXERCISES.

1.- Fill in the blanks with an appropriate noun or adjective coming from a multi-word verb.

1.- The results are fed back into the computer to update the program.
The____________________enables us to update the program.

2.- Our car broke down on the motorway.
We had a________________ on the motorway.

3.- The program of research is going on with no problems.
It is an________________ program of research.

4.- The negociations on disarmament broke down.
There was a________________ of negociations on disarmament.

5.- Scientists say they are beginning to break through in the fight against cancer.
It is a major________________ in cancer research.

6.- His nerves broke down under the pressure of work.
He suffered a nervous________________ because of work.

7.- World War II broke out in 1939.
The________________ of W.W. II took place in 1939.

8.- The British Empire broke up when the colonies became independent.
The________________ of the British Empire started when the colonies became independent.

9.- Our radio station is going to broadcast a new program next month.
The__________________ of our new program is going to start next month.

2.- Fill in the gap with one of the following nouns or adjectives coming from a multi-word verb.

OUTCOME
DRAWBACK
HANGOVER (2)
OUTLET
OUTPUT
CUT-OFF
GO-BETWEEN
LAYOUT
INLET
INPUT
CUTBACK
HAND-OUT
OUTLAY
PAYOFF
OUTSTANDING

1.- The____________________ of that car factory is well below average. They might have to close it down.

2.- The lack of funds was a serious______________ to carry out the research project.
3.- This is the_________________ valve of the engine.

4.- We reached the end of the path.
We reached the______________ point of the path.

5.- The water enters the mechanism through the_____________ pipe.

6.- Kevin has drunk too much. Tomorrow he will be suffering from a__________________.

7.- What was the______________ of the meeting?
It was very positive. We managed to get almost everything we claimed.

8.- The University spending has been reduced.
There has been a________________ in University spending.

9.- Here you have the_______________ of the school. The library is on the second floor, in front of the staircase.

10.- The negociations were easier thanks to Mr. Pérez de Cuéllar who acted as a____________________.

11.- This procedure is a________________ from the old system.

12.- Last year there was a considerable_________________ on raw materials for industry.

13.- He was an______________ professor. His students still remember him.

14.- The average_________________ of the factory is twenty cars a day. We must increase it to meet demand.

15.- The data____________in the memory of the computer failed because there was a power cut.

16.- This_______________ will help you to decide which computer you can buy. It includes a list of prices, facilities, etc.

3.- Read the following text.

MACHINES WITH BRAINS.

During the last hundred years, industry has become more and more mechanised. Machines have already taken over much of the work that was formerly done by human hands and muscles. But in the past each machine had to be looked after by a man or a woman whose eyes and brain controlled and guided it. Now a great change in our tools has begun to take place due to industry automation. The machines themselves have "eyes" and "brains", so that people are not needed to attend them. These eyes and brains are supplied by specially-designed electrical circuits.

The operation of automatic machines is based on "feedback". The machine is given a way of "watching" what it does and of "recognising" when to stop and do something else. A simple example of feedback can be found in the control of a central-heating oil-burner by a thermostat.

The working part of a thermostat is a bar made of two pieces of different metals, attached back to back. The two metals expand when they get warm, but one expands faster than the other. As a result, when the bar gets warm, it begins to curl. When it cools off, it straightens out again. The bar is set next to a screw, so that it touches the screw when it is straight, but pulls away when it is curled. The bar and the screw are both part of an electrical circuit that controls the switch mechanism of the oil-burner. When the air in the building becomes cool, the bar cools, straightens, and touches the screw. This completes an electric circuit and the oil-burner is switched on. As the air in the building becomes hotter, the bar becomes hot, and it begins to curl. It pulls away from the screw, the current stops flowing and the oil-burner is switched off. A thermostat of this kind can be adjusted to keep the temperature of the house at any required level.

Completely automatic machinery is now used in oil refineries. The oil is "cracked" by heat with the help of a catalyst --in this case, a powder that speeds up the refining process. The oil is broken up into petrol and other products which are then separated from each other. The process goes on non-stop. Oil flows into the machinery at one end and the refined products flow out of the other. The catalyst is used, cleaned and used again. Automatic controls are used not only to regulate the temperature, but the rate of flow of materials and many other things.

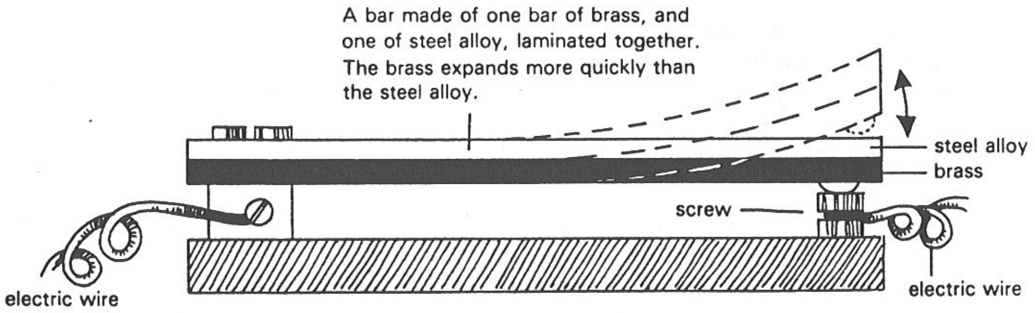

A bar made of one bar of brass, and one of steel alloy, laminated together. The brass expands more quickly than the steel alloy.
steel alloy
brass
screw
electric wire
electric wire

Fig. 6.1 A thermostat

4.- Now **match the following phrasal verbs** from the text **with** their corresponding **Latin verb**, according to the meaning they have in the text.

TAKE OVER
LOOK AFTER
COOL OFF
STRAIGHTEN OUT
PULL AWAY
SWITCH ON
SWITCH OFF
SPEED UP
BREAK UP
FLOW INTO

CONNECT
ACCELERATE
SUBSTITUTE
SEPARATE
ATTEND TO
REERECT
FRESHEN
DISCONNECT
CIRCULATE
DISSOLVE (separate)

5.- Write a sentence using "feedback".

6.- Complete each of these definitions with a word taken from the list below:

Catalyst
Circuit

Control
Refinery

Thermostat

1.- A_________________ is a complete path through which an electric current can travel.
2.- A_________________ is a substance that speeds up a chemical process without being changed itself.
3.- A_________________ is a place where substances are made pure.
4.- A_________________ is a device for automatically regulating temperature.
5.- A_________________ is the means by which a machine is operated or regulated.

Comprehension

B. Choose the correct answer a, b, c, or d, to each of the following questions:

(i) According to the passage, in what way is industry changing now?
a. Machinery has replaced human hands and muscles.
b. Machines are being automated.
c. All industrial processes are now completely automated.
d. Men and women are not needed in large numbers in industry now.

(ii) According to the passage, what is the purpose of 'feedback' in automation?
a. It provides power to the machines.
b. It provides the machines with information.
c. It speeds up the refining process.
d. It does the work of a catalyst.

(iii) According to the passage, what happens to one of the pieces of metal in the bar when the temperature falls?
a. It touches a screw.
b. It moves away from a screw.
c. It heats the oil.
d. It increases the flow of heat.

(iv) According to the passage, what is the function of the catalyst in refining oil?
a. It operates a thermostat.
b. It regulates the temperature, pressure and flow of materials.
c. It helps to speed up the process of 'cracking' the oil.
d. It is part of an electrical circuit.

4.- Read the following text.

CAR-RUNNING INSTRUCTIONS.

Filling up with fuel.

When filling up with fuel avoid overfilling the tank. The fuel should not be visible in the filler intake tube. If it is and the car is left in the sun, the fuel may expand and cause the fuel to leak. If the tank is accidentally overfilled, park the car in the shade with the filler as high as possible.

Starting.

Check that the gear lever is in the neutral position and that the hand-brake is on. If the engine is cold, pull out the mixture control (choke). Switch on the ignition, check that the ignition and oil-pressure lights glow, and operate the starter. As soon as the engine starts, release the ignition key and warm up the engine. Check that the oil-pressure gauge is registering or that the oil-pressure light goes out.

Warming up.

It is very harmful to warm up the engine allowing it to idle slowly because it leads to excessive cylinder wear. The correct procedure is to let the engine run quite fast, approximately one thousand revolutions (revs) per minute (1000 rpm), corresponding to a speed of 25 kph in top gear. This allows it to reach its correct working temperature as quickly as possible. Less damage is done if you drive the car from cold, than if you let the engine idle slowly.

Running in.

The way a new car is looked after will have an important effect on its future life. Engine and road speeds during this early period must be limited. During the first eight hundred kilometres:

Do not exceed 70 km per hour.
Do not operate at full throttle in any gear.
Do not allow the engine to labour in any gear.

After the running-in period, speeds should be gradually increased up to maximum performance.

Ignition light.

The light should glow when the ignition is switched on. It should go out and stay out at all times while the engine is running above normal idling speed. On cars with alternator, the warning light should go out immediately once the engine is started. Failure to do so shows a fault in the battery-charging system. Check that the fan-belt is correctly tensioned, before consulting your dealer.

Temperature gauge.

When the engine is running, the gauge shows the temperature of the coolant leaving the cylinder head. When the ignition is switched off, the needle returns to the "cold" position.

A) Find the phrasal verbs in the text that are closest in meaning to these Latin verbs.

________________ OCCUPY (all the space of something)
________________ FUNCTION
________________ CONNECT
________________ ATTEND TO
________________ MOVE (remove by pulling)
________________ DISCONNECT
________________ CEASE TO BE USED (finish)
________________ REHEAT (prepare something for work beforehand)

B) Can you find any nominalized forms in the text? Are they nouns or adjectives? Say the phrasal verb from which they have developed.

C) What do these compound nouns mean?
-filler intake tube
-gear lever
-hand-brake
-oil-pressure gauge
-battery-charging speed

D) What do the following refer to?
-'it' on line 3.
-'it' on line 15.
-'so' on line 33.

E) Change the following into definitions in the style of the sentence below:
e.g. "A jack is a tool which is used for raising a car"

1.- alternator / mechanical generator / used for / supply / alternating current.

____

2.- coolant / liquid / used for / cool / engine

____

3.- starter / electric motor / used for / start / car engine

____

4.- choke / valve / used for / control / intake of air

____

5.- gauge / instrument / used for / measure / oil pressure

____

5.- Read the text.

MICROWAVES.

Frequencies from 1 to 10 GHz are referred to as microwave. Microwave radio is one of the chief means of transmitting long-distance telephone calls and television programmes. As with coaxial cable, the high bandwith of microwave channels can transmit many thousands of telephone calls and many television programmes simultaneously. Microwave antennas, within line-of-sight of each other, are erected on tall towers and rooftops. These antennas and towers form chains across the country, each location amplifying and retransmitting signals. They are usually spaced about 30 miles apart. If they were farther apart, the curvature of the earth and the varying retractive index of the atmosphere would necessitate very high towers, since absorption due to rain and snow would become severe, and large, expensive antennas would be needed.

Many cities throughout the world now have skylines that are dominated by a tower carrying microwave antennas. Tokyo has a tower like the Eiffel Tower but 40 feet higher. East Berlin has 1185 feet high. One of London's most expensive dinners can be eaten in a revolving restaurant just above the Post Office tower microwave antennas, and Moscow possesses a tower that is 250 feet higher than the Empire State Building.

Such relays today use frequencies from about 1 to 12 GHz. The higher the frequency, the easier it is to direct a narrow beam that does not interfere with other nearby transmitters using the same frequencies. A 12 GHz beam spreads over an angle of about 1º.

Different moisture and temperature layers can cause the beam to bend and vary in amplitude. Occasionally bending effects can cause fading. Rain can increase the attenuation slightly, especially at the higher microwaves frequencies. To a limited extent, automatic compensation for changes in the radio attenuation is built into the repeaters.

(From: James Martin, *Future Developments in Telecommunications*,
2nd ed. 1977)

a) The text is full of verbs which have a Latin origin. Find the Latin verbs that are closest in meaning to the following phrasal verbs.

ERECT--------> put off / put up / set up
FORM---------> make up / break up / divide into
TRANSMIT-----> give off / see through / send out

b) Find a synonym for the following:

-"are usually spaced about 30 miles apart"

____

-necessitate:__________________
-dominate:____________________
-revolving:___________________
-possess:_____________________
-interfere:___________________

-"augment" and "raise" are two verbs that mean the same as a verb used in the text. Which one?_________________________

c) Do you think this text is from:
1.- U.S.A.　　2.- U.K.?

d) Do you think the text comes from:
1.- a technical manual
2.- a general textbook
3.- other?

e) Microwave transmissions take the form of:
1.- pulses　　2.- scatter　　3.- beams

f) TRUE or FALSE?

1.- Rain can cause attenuation of microwave frequencies.
2.- Microwaves are v.h.f. frequencies.
3.- Microwave transmissions use all frequencies.
4.- All microwave towers amplify the signals they receive.
5.- London has the highest microwave tower in the world.
6.- Microwave towers transmit signals to satellites.
7.- Microwave towers send TV signals only.
8.- The higher the frequency, the narrower the beam.
9.- To transmit 1000 km at least twenty towers are needed.
10.- High towers are necessary in snow.

g) Fill in the blanks:

Microwave radio is used to transmit thousands of_________________ calls and __________________programmes simultaneously. Because of the_________________ of the earth and the effects of the earth's ____________________, antennas are placed high above the ________ ______________ in __________________ of__________________ of each other, about 30 __________________ apart. Each tower ____________ and retransmits the __________________ it receives.

h) Complete the sentences:

The Eiffel Tower is 1051 feet high.
The Empire State Building is 1472 feet high.

1.- The Tokyo Tower is___________________ high.
2.- The East Berlin Tower is__________________ high.
3.- The Moscow Tower is___________________ high.

UNIT 9.

WORD FORMATION: PREFIXES AND SUFFIXES.

This unit deals with word formation and subtechnical vocabulary within a scientific and technical context, being thus devoted to the study of some lexical items. We will illustrate the main prefixes and suffixes in word formation, paying special attention to the **negative and privative suffixes** since they are more troublesome than the others, which are more similar to those used in Spanish or Catalan.

Subtechnical vocabulary refers to those words that have the same meaning in different scientific and technical fields. Even though they may appear throughout the course, we will make a survey of some of the commonest subtechnical words.

9.I DEFINITION.

When you are reading, you will come across unfamiliar words. However, it is often possible to guess the meanings of these words if you understand the way words are usually formed in English:

PREFIXES + (STEM) + SUFFIXES

Prefixes come before the stem, and they usually change the meaning of the word.
e.g. ***de**magnetize* (meaning *to deprive of magnetism*)

Suffixes come at the end of the stem, and they do not change the meaning of the word but the category of the word into a noun a verb, an adjective, etc.
e.g. *program**mer*** (it is a noun meaning *the person who programs*)

9.I.1. PREFIXES.

Here are some prefixes, their usual meanings and how they change the meanings of English words.

.NEGATIVE & PRIVATIVE:

*anti-	*dis-	*non-
*contra-	*in-	*un-
*de-	*mis-	*under-
*a-		

.POSITIVE:

*re-	*over-	*bi-

.SIZE:

*macro- / micro-
*maxi- / mini-
*semi-
*out-
*over-

.LOCATION:

*ex-
*infra-
*inter-
*trans-
*sub-
*super-

.TIME & ORDER:

*ante- / pre-
*retro-
*prim-
*post-

As the negative & privative tend to be more troublesome than all the others, we are going to concentrate on them.

TABLE I - NEGATIVE PREFIXES -

	meaning	*added to:*	*examples*
UN-	*"the opposite of"* *"not"*	*adjectives* *participles*	*unfair* *unexpected*
NON-	*"not"*	*various classes*	*non-conductor*
IN-	*(as for UN-)*	*adjectives*	*insane*
DIS-	*(as for UN-)*	*adjectives* *verbs* *abstract nouns*	*disloyal* *dislike* *disfavour*
A-	*"lacking in"*	*adjectives* *nouns*	*atypical* *asymetry*

(IN- changes into IL- before /l/, e.g.: illogical.
IM- before bilabials, e.g.: improper.
IR- before /r/, e.g.: irrelevant)

TABLE II - PRIVATIVE PREFIXES -

	meaning	*added to:*	*examples*
UN-	*"to reverse action"* *"to deprive of"*	*verbs*	*untie* *undo*
DE-	*"to reverse action"*	*verbs* *abstract nouns*	*decode* *deforestation*
DIS-	*(as for UN-)*	*verbs* *participles* *nouns*	*disconnect* *discoloured* *discontent*

EXERCISES:

1.- The opposites or negatives of many words are made by putting UN- in front of them. Some other words use IN-, IM- or AB-, as we have seen in the previous tables.
CONTRACT the relative clauses given below, as in the example.

e.g. a leaf *which is not covered* is
an *uncovered leaf.*

1.- a plant which had not developed...
2.- chlorophyll which has not dissolved...
3.- the change which had not been observed...
4.- the gas which had not been expanded...
5.- the water vapour which has not been condensed...
6.- liquid which is not converted...
7.- water which has not been filtered...
8.- latex which has not been treated...
9.- water which is not chlorinated...
10.- conditions which are not variable...
11.- pressure which is not changed...
12.- a rate which has not been determined...
13.- a reason which has not been explained...
14.- the experiment which had not been finished
15.- growth which is not normal...
16.- the gas which cannot be seen...

2.- a) Add the prefix DIS- to form opposites of the following:

NOUNS: ability, advantage, appearance, order, use.
VERBS: agree, like, prove, integrate.
ADJECTIVES: similar.

b) Fill in the blanks in the following with appropriate words formed in exercise (a):

1.- When one thing is different from another, the two things are said to be___________________.

2.- In many cases, economic instability may lead to political and social_____________________.

3.- Hillebrand's assumption regarding the nature of the gas he had studied was ______________ed by Rayleigh's investigations.

4.- It is well known that atrophy, i.e. the wasting away of certain mental and physical characteristics, is caused mainly by ____________________.

5.- When a system breaks down or is split up into its separate parts, it is said to __________________.

6.- The main ________________ of that new engine is that it requires a lot of electrical power.

7.- *Dot-matrix printers do not have a very good printing quality and they cannot be compared with the accuracy of laser or even ink-jet printers. That is the reason why I_______________ these old-fashioned dot-matrix printers like mine.*

8.- *The_______________ of the local industry has caused some members of the Government to_______________ in their points of view.*

3.- NON- may be added to some words, giving them a negative meaning of which is not / which does not":

(1a) a substance which is not a metal (1b) *a non-metal* (Noun)
(2a) which does not condense (2b) *non-condensing* (Adj.)

MAKE WORDS OUT OF THESE DEFINITIONS, MEANING

1.- *A substance which is not a conductor* _______________
2.- *which does not reflect* _______________
3.- *which is not poisonous* _______________
4.- *which does not rotate* _______________
5.- *which is not spherical* _______________
6.- *which does not adhere* _______________
7.- *which is not transferable* _______________
8.- *which is not combustible* _______________
9.- *which does not exist* _______________
10.- *which is not electric* _______________

4.- Now write the sentences below as in the example given. Use the correct negative prefix (IN- / UN-) in each case:

e.g. The results of the experiment were | *not accurate.*
| *innacurate.*

That kind of cable is | *not common.*
| *uncommon.*

1.- It is *not natural* for animals to live in zoos.
2.- He was *not able* to complete his experiment as his instruments were *not accurate* and his calculations *not correct.*
3.- Metals are *not organic.*
4.- The exact number of organisms in the world is *not known* and *not calculable.*
5.- Our information about new transmissions is still *not complete.*
6.- The performance of that motor is *not usual.*
7.- Those two portions are *not equal.*

5.- Look up the meanings of these words in your dictionary:
ILLEGAL / IMPURITIES / IRREGULAR / IMPERMEABLE / INORGANIC

Complete each of these sentences with a word taken from the above list.

1.- The ________________ in the metal were reduced by oxidisation.
2.- It is ________________to exceed the speed limit.
3.- The mechanic investigated the ________________ flow of petrol into the engine.
4.- The geologist found an ________________ layer of rock thirty metres down.
5.- In some basic engineering courses you are required to do both general and ______________ chemistry.

6.- Rewrite the sentences below using words with prefixes. Do not change the meaning of the sentence, choose from the prefixes given: UN- / MONO- / MIS- / RE- / DE-
e.g. The wheels are *not aligned correctly* / *misaligned.*

1.- The conditions were *not satisfactory* so the test was stopped.
____
2.- The cycle was *not usual* because it *had only one wheel.*
____
3.- Your notes are *not clear* so *organize* them *again.*
____
4.- *Write* this text *again* because the style is not very technical.
____
5.- This coil has *lost its magnetic properties.*
____
6.- This piece of iron is *not well shaped*. It will not fit in the engine.
____
7.- Due to overheating, that piece of iron bent and *changed its form.*
____

7.- Fill in the blanks using UNDER-/ OVER-/ MIS-/ RE-/ NON- :

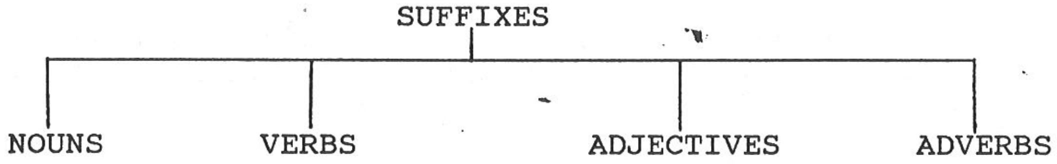
1.- When the engineer ____strightened the bent piece of metal, he found that it had lost part of its strength.
2.- Researchers tend to ____estimate the importance of subjective factors in an investigation.
3.- That machine is ____worked. It will break down one of these days.
4.- It is difficult to explain scientific processes in a ____-technical language.
5.- One of the most serious problems of our age is that of the ____use of science by governments.
6.- The result of ____production is a surplus.
7.- With the crisis we had to ____value our house by $10,000. that is 15 % less than its cost last year.

9.II SUFFIXES.

Unlike prefixes, suffixes do not alter the meaning of the word, changing the word to the negative or indicating size, location, time, etc. Suffixes change a word from one class to another, that is, from an adjective into a noun, or a verb, for example.

e.g. VERB NOUN
To resist------>resistance

ADJEC. ADVER.
quick--------->quickly



9.II.1 NOUN SUFFIXES.

a) Those that combine with a noun, making abstract or concrete nouns:

-ANCE ---> performance
-ENCE ---> independence
-ING ---> multiplexing
-IST / YST---> typist, analyst
-ISM ---------> magnetism
-SHIP----> relationship, friendship

b) Those that combine with a verb, making concrete countable nouns, some of personal reference:

-ER / OR -------------> programmer, operator
-ATION / TION----> execution, combination
-ING------------------> reading, writing
-MENT---------------> measurement, agreement

c) Those that combine with an adjective, making abstract (uncountable) nouns:

-ITY -------> electricity
-IAN-------> electrician
-NESS ------> cleanliness
-DOM -------> freedom

EXERCISES.

The **suffix -ENCE (-ANCE)** turns **verbs into** corresponding **abstract nouns**, e.g. accept*ance*, meaning the action of accepting, exist*ence*, maning the quality of existing, etc.

1.- Using an English-English dictionary, and following the example, supply the correct noun form of the following verbs:

e.g. PERSIST -----> PERSIST*ENCE*

*RESIST*__________________
*INTERFERE*______________
*DIVERGE*________________
*EMERGE*_________________
*ASSIST*_________________
*CONVERGE*_______________
*SIGNIFY*________________
*DEPEND*_________________
*DIFFER*_________________
*DISTURB*________________
*PERFORM*________________
*APPEAR*_________________

2.- From the table completed in exercise (1) above, choose the appropriate noun to fill in the blanks in the following sentences:

1) The em_____________ of new nations has given rise to further international problems.
2) Agricultural researchers are now producing plants which are much more r_______________ to disease and adverse atmospheric conditions than previously.
3) Economic instability can lead to political d__________s.
4) If a researcher encounters dif________________s between two parallel experiments, he has to find out whether they are significant or not.
5) Laboratory equipment must be designed to give a high level of p______________.
6) An investigator should do his best to isolate his experiments from in______________ due to chance or random factors.

The **suffix -ER** and its variant **-OR form nouns from verbs**, with the general meaning of: person or thing which does something, e.g. work*er*, operat*or*, conduct*or*, etc.

3.- Add -ER /-OR to the following verbs to form nouns:

BOIL_____________
COUNT____________
CONVERT__________
FILL_____________
TRANSMIT_________
INVESTIGATE______
BREED______________
REACT______________
INSULATE___________
START______________
TRANSFORM__________
DIRECT_____________
CONTAIN____________
PRODUCE____________
INDICATE___________
DEMONSTRATE________

4.- Complete the following table and try to extend your vocabulary:

VERB	ABSTRACT NOUN	NOUN	VERB
Compile	Compilation	Intention	____________
____________	Execution	Collaboration	____________
Translate	____________	Inference	____________
____________	Instruction	Announcement	____________
____________	Interpretation	Performance	____________
Require	____________	Manipulation	____________
____________	Operation	Drawing	____________
____________	Definition	Researcher	____________
____________	Production	Involvement	____________
Generate	____________	Tolerance	____________

The **suffix -NESS** forms **abstract nouns from adjectives**, e.g. effective*ness,* useful*ness,* etc.

5.- Form abstract nouns from the following adjectives:

CLEAR______________
COLD______________
DARK______________
FLAT______________
HEAVY______________
ROUGH______________
UNSTEADY______________
THIN______________
WEAK______________
STEADY______________
THICK______________
LIGHT______________
COOL______________
DAMP______________
EXACT______________
FULL______________
QUICK______________
SHARP______________

6.- Combine the following sentences. Change the adjective to the noun form in parenthesis as in the example given:

0. It was well known.
The young engineer was eager to experiment. (eagerness)
-The young engineer's eagerness to experiment was well known.

1.- It brought him success.
He was determined to find a solution. (determination)

2.- It made him famous.
He was ready to try out new ideas. (readiness)

3.- It was apparent.
He was eager to become an engineer. (eagerness)

4.- It was unfortunate.
He was inclined to ignore the engineer's advice. (inclination)

5.- It was essential.
He was free to try out new solutions. (freedom)

6.- It was astounding.
The young engineer was able to find solutions to difficult problems. (ability)

9.II.2. ADJECTIVE SUFFIXES.

They are used to form adjectives, especially **from nouns**. The most important are:

-FULL-->("Full of", "providing") combines with abstract nouns to form gradable adjectives as in *useful, helpful,* etc.

-LESS --> ("Without") combines with both abstract and concrete nouns, as in *useless, helpless, colourless,* etc.

-LY --> ("having the qualities of") combines with concrete nouns, as in *(wo)manly, friendly,* etc. It also combines with nouns that are units of time ("every"), as in *daily, weekly,* etc.

-LIKE--> ("like", "having the qualities of"), as in *childlike, pistonlike,* etc.

-Y --> ("somewhat like", " characterized by") combines largely with concrete non-count nouns, as in *hairy, creamy,* etc.

EXERCISES.

-FUL and **-LESS** can sometimes be added (as opposites) to the same noun.

1.- Add those suffixes to the following nouns to make antonyms as in the example given:

e.g. 1) This object has *a use.* --> it is a useful object
OR it is useful.
2) This object has *no use at all.* --> It is useless
OR it is a useless object.

1) This sentence has *a meaning*. It is________________.
This sentence has *no meaning at all*. It is___________.
2) This object has *a purpose.* It is_________________.
This object has *no purpose at all.* It is_____________.
3) This engine has *power.* It is____________________.
This engine has *no power at all.* It is______________.
4) This liquid can cause you *harm.* It is a___________.
This liquid can cause you *no harm at all.* It is______ ___________ liquid.
5) His wound gave him a lot of *pain.* It was a___________ wound.
The treatment of the wound caused *no pain.* The treatment was_______________.

2.- Form adjectives from the following nouns by adding **-LESS:**

CLASS________________
EFFORT________________
LIMIT________________
ROOT________________
WEIGHT________________
COLOUR________________
JOB________________
MOTION________________
PURPOSE________________
WATER________________

Now, from the adjectives formed above, choose the appropriate ones to fill in the blanks in the following:

a) Water is a______________liquid.
b) A body moving in space is______________ and therefore it floats.
c) A desert is almost entirely______________.
d) At absolute temperature (A°) the molecules of the body are________________.
e) People who are unemployed are said to be ______________; because of this they have no daily objectives to attain and their lives become______________.
f) The prospects of improving the conditions of society by intelligent application of science seem to be__________.
g) Do you think a________________society is possible or desirable?.

*There are also other adjective suffixes of **foreign origin** which are very common.

-AL (also -IAL and -ICAL) as in *statistical, editorial, mathematical,* etc.

-IC as in *atomic, specific, symbolic,* etc.

-OUS as in *virtuous, vivacious,* etc.

*There are two common suffixes that are used to form adjectives **from verbs**, and they are in contrast in respect of verbal voice:

-IVE--> related to the active.
e.g. The idea attracts me ---> is *attractive*.

-ABLE--> related to the passive.
e.g. The text cannot be translated -->
is *untranslatable*.

Other examples: *washable, drinkable, supportable, etc.*
effective, supportive, etc.

3.- There are many adjectives ending in **-AL** which have no English noun. These adjective have been formed direclty from Latin. However, each adjective is paired with an ordinary English noun.
e.g. 1.- It is permitted by the *law.* / It is *legal.*
It is essential to *life.* / It is *vital.*

From the following two groups, make pairs and complete the sentences with the right adjective:

(1) *mouth, hand, mind, back, tooth, nose, voice, end, death, country.*
(2) rural, mortal, nasal, vocal, mental, oral, dental, dorsal, manual, final.

a) After the written test, the student took an______________ test.
b) People who speak through their noses have________________ voice.
c) Physical exercise is different from____________exercise.
d) Sounds made by voices are__________________sounds.
e) A wound which causes death is a_____________________wound.
f) Decay in the teeth is called________________________decay.
g) Work done with the hands is called__________________work.
h) Life in the countryside is called___________________life.
i) The fin on a fish's back is its_______________________fin.
j) The last step in an experiment is the_______________step.

4.- The element **-ABLE** can ve added to almost all English verbs.
to eat---> *eatable*

Find the adjective corresponding to the verb in these sentences:

1) We are able to break it. It is______________________.
2) We are able to define it. It is_____________________.
3) We are able to describe it. It is___________________.
4) We can prove it. It is_______________________________.
5) It can be understood. It is__________________________.
6) It can be read. It is_________________________________.

5.- The following exercise contains a number of common words in **-ABLE** which are not formed according to the pattern seen in the previous exercise.
e.g. The weather changes a lot. (*change-*)
The weather is very *changeable.*

1) This machine suits our needs. The machine is____________.
2) This material can be dispensed with. The material is ________________.
3) He gets a profit out of his computer business. His business is________________.
4) You can distinguish which TV set is the best. The best TV set is___________________.

9.II.3. VERB SUFFIXES

Only a few verb-forming suffixes occur with great frequency in English:

-ATE--> combines with neo-classical noun bases, as in *orchestrate, hyphenate.* This suffix is especially productive in scientific English, as in *chlorinate, (de)laminate,* etc.

-EN--> combines with adjectives, as in *redden, widen, harden*, meaning "to make sth or sb *red, wide, hard*" or "to become *red, wide, hard*".

-(I)FY--> combines with adjectives and nouns, as in *simplify* "to make simple", *amplify* "to express more fully", *codify* "to put into code". It is most commonly found with neo-classical bases, as in *certify, identify.*

-IZE (-ISE)--> combines freely with adjectives and nouns, as in *modernize* "to make modern", *legalize* "to make legal", *dieselize* "to convert to diesel-engine power".

EXERCISE.

1.- Some verbs are formed by adding **-EN**:
e.g. *to become longer* ----> *to lengthen*

Rewrite these sentences using a verb formed with -EN.

1.- The liquid in the test tube is *becoming thick.*

___

2.- A screw in the engine is *getting loose* due to the vibration produced.

___

3.- The surface of that material *became softer* after the chemical treatment.

___

4.- When the metal band around the wheel contracts on cooling, it *gets tighter.*

___

5.- In order to increase the current, the wires should *be made thicker*, and this will *make* the resistance *less.*

___

___

6.- We have to get a new alloy that can *be harder.*

___

7.- In order to *make* the current *stronger*, the potential must be increased.

___

2.- Sometimes **-FY** may be added to an adjective to form a verb meaning MAKE + adjective:

e.g. to make solid ----> *solidify*

Form verbs from these adjectives in the same way. Be careful with the spelling.

1. make liquid
2. make pure
3. make bigger (magni-)
4. make rare
5. make solid
6. make humid

Now use these verbs in their correct form to complete these sentences:

1. When ice is heated, it________________________________.
2. If you cool water sufficiently, it__________________.
3. When oxygen replaces carbon dioxide, the blood is ______________________.
4. A magnifying glass is a glass which__________________.
5. At great heights above the earth the air is__________.
6. Water evaporating from the earth's surface___________ _______the atmosphere.

The suffix **-IZE** is added to nouns and adjectives (mainly of Latin and Greek origin), if they have two or more syllables. The nouns to which -IZE is added are usually **academic** or **scientific**, and include the names of inventors, etc.

3.- Complete these sentences:

1.- They made a summary of the technical report. They_____ ________________ the report.

2.- They stated the information item by item. They i______ ________________ the information.

3.- He killed the germs in milk, as Pasteur did. He_______ ________________ the milk.

4.- He made the system central. He______________the system.

5.- He made the methods human. He______________the methods.

6.- He made the trade of raw materials legal. He__________ the trade.

7.- They (sterile)_______________the instruments by putting them in boiling water.

8.- He made the performance of the communications system optimum. He______________________the performance of the communications system.

9.- He put an advert in a newspaper to attract new clients. He__________________his company to attract new clients.

10.- The doctor (immune)_________________his patients gainst cholera.

4.- Each suffix in List A can be connected to three words in List B. Form these words and write at least 5 sentences using some of them.

A. -IFY -LY -LESS -ENT -ENCE -OR
-NESS -ABLE -IBLE -ANT -ANCE -ER

B.
use
effective
identify
simple
reason
convert
divide
distant
evident
investigate
boil
diverge
count
predict
solid
absolute
hard
meaning
differ
reverse
exist
assistant
resist
research
interfere
react
produce
liquid
possible
transfer
direct
motion
persist
maintain
signify
perform

9.III SUBTECHNICAL VOCABULARY. Some confusing words.

There are some English words which may lead us to confussion when reading or trying to translate a text from Spanish or Catalan into English. Some of those words are similar in form, but not in meaning, to Spanish words. Others have a slightly different spelling.

Such problems can be solved being aware of the fact and with the help of a good dictionary.

Here is a list of some of those words or expressions with short explanations about the part of their meaning which may be confusing for Spanish speakers.

ACTUALLY / PRESENTLY.

REALMENTE AHORA.

Actually means really, in fact. **Presently** means "now" or "currently" in mid position and "after a short time" in initial and final position.

ANNOUNCEMENT / ADVERTISEMENT — ANUNCIO —

—CUMPLEANOS. TRABAJO, TV.

Both words correspond to the Spanish word "anuncio", but whereas an engagement or a birth is announced, a job is advertised. On the other hand, personages, organizations or similar announce decissions or events, and TV, radio or newspapers advertise products or events.

BASE / BASIS

SOPORTE. FUNDACION.

A **base** is the lowest part of something, the part on which something rests or is supported. A **basis** is the main principle that underlies something, foundation.

BILLION - BILLON (1 MILLON DE MILLONES).

- 1000 MILLONES.

In British English billion corresponds to the Spanish word "billón" (1,000,000,000,000). In American English, a **billion** is one thousand million (1,000,000,000).

CAREER / COURSE / YEAR

PROMOCIONARSE= PROFESION OCUPACION. LECCIONES LECTURAS. CURSO.

A **career** is a profession or occupation with opportunites for advancement or promotion. When someone has a University degree we say that he/she has University education. A **course** is a series of lessons or lectures on something. A **year** corresponds to the Spanish word "curso". For instance: a second-year student (de segundo curso).

CONVENIENT / SUITABLE / ADVISABLE

COMODO, OPORTUNO. CONVENIENTE.

Suitable and **advisable** may be transalated into Spanish as "conveniente", whereas **convenient** is close to th Spanish word "cómodo" or "oportuno".

DETERMINATE / DETERMINED

LIMITADO, FIJO. RESOLUCIÓN.

Determinate means limited or fixed. **Determined** means resoluted, with one's mind firmly made up.

ECONOMIC / ECONOMICAL

ECONOMIA BARATO

Economic problems are those problems related to economics or economic sciences, whereas **economical** means that something is cheap, inexpensive.

GRADE / DEGREE / TITLE / LICENSE

CALIDAD, CLASIFICACIÓN. TITULO ACADEMICO. NOBEL, CONDE. CONDUCIR, ALCOHOL, TABACO.

Grade means quality or level of classification. A **degree**, among other things, is an academic title (take a degree in Computing, for example). A **title** tells us a person's rank (Captain, Lord....). A **license** may be given to sell alcoholic drinks, tobacco, or to drive a car.

LAST / LATEST

ELVIS. MADONNA.

Last means coming after all others in time or order with no possibilities of having another one. For instance, Elvis' last record. But when talking about somebody who is alive or a brand that is still working, we say his/her latest record, or Apple's latest computer, etc.

PREPARATION / FORMATION / TRAINING

PREPARATIVOS. PREPARACION. ACADEMICO Y TRABAJO.

Training is the best translation for the Spanish word "preparación" when dealing with academic or work affairs. In other fields **formation** is preferred. **Preparations** is similar to the Spanish word "preparativos".

SCIENTIST / SCIENTIFIC

PERSONA. ADJETIVO.

A **scientist** is a person who is an expert on, or studies, natural or physical sciences. **Scientific** is an adjective, e.g. a scientific discovery.

UNIQUE / ONLY / SOLE.

UNICO EN EL MUNDO.

They can all be translated into Spanish as "único". **Unique** means being the only one of its kind, e.g. a unique talking computer in the world. **Sole** and **only** are very similar, though the latter is less formal.

Translate these sentences into English:

1) Ayer vi un anuncio en el periódico para una compañía que necesita un experto en *Electrónica de Potencia / Mecánica de Fluidos / Electrónica Industrial / Química orgánica.*

2) Soy un estudiante de tercer curso de *Telecomunicaciones / Ingeniería Industrial.*

3) Los estudiantes de *Telecomunicaciones / Ingeniería Industrial* pueden hacer una buena carrera profesional en esta empresa siempre y cuando hayan tenido una buena preparación universitaria.

4) En aquel anuncio necesitaban un persona determinada para un puesto en concreto.

5) Esa empresa de ordenadores tendrá en un futuro no muy lejano serios problemas económicos.

6) Apple acaba de sacar al mercado el último modelo en ordenadores portátiles.

7) En realidad, ha tenido una buena preparación para trabajar como ingeniero y creo que es el candidato adecuado para ese tipo de trabajo.

8) El nuevo supercomputador es único en el mundo.

UNIT 10.

TECHNICAL REPORT WRITING.

10.I **WHEN WRITING A COMPOSITION...**

Try to be ***CLEAR, EFFICIENT*** and ***ACCURATE***. That is to say, you should bear in mind that:

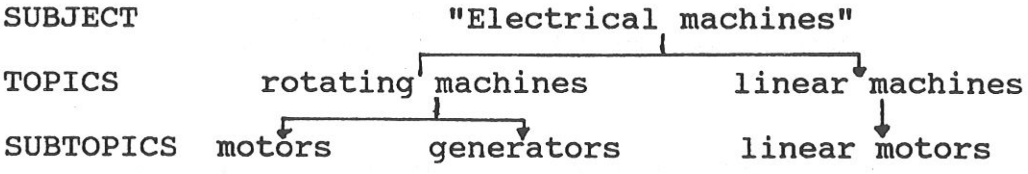
*your ideas have to be structured *coherently* and *clearly;* therefore, use PARAGRAPHS.

*your ideas have to be expressed *efficiently;* it is better to use SHORT and CORRECT SENTENCES than long and wrong ones. Also link your sentences with CONNECTORS.

*try to be as *accurate* as possible and use PUNCTUATION. In technical registers, don't get too personal and use the PASSIVE VOICE.

10.II **PARAGRAPHS.**

Generally, a **subject** requires a division into **topics**, each of which should be treated in **a different paragraph.**



Division into **Topics**-------> Division into **Paragraphs**

The object of treating **each topic in a paragraph** by itself is, of course, an aid to the reader. The beginning of each paragraph is a signal to thim that a new step in the development of the subject has been reached.

Therefore, as a rule, **each paragraph has to begin with a sentence that suggests the topic** or with a sentence that helps the transition between different paragraphs (this will create a path the reader can follow).

If a paragraph forms part of a large composition, its relation to what precedes must be expressed by using a connector or a phrase in the first sentence ("however", "again", "for that reason", etc) to link ideas.

So what makes a group of sentences a paragraph is:
- that all sentences are related in topic
- that the sentences are linked by means of connectors or by using pronouns to avoid repetition.

Transitional words (or connectors) link ideas within a sentence, and also describe the relationship between sentences. The following chart summarizes various transitional words and phrases and illustrates their use:

Transitional Words/Phrases	Used to:
and, in addition to, furthermore, moreover, also	show a relationship of addition
however, but, in contrast to, yet, nevertheless, on the other hand, on the contrary, at the same time	show a relationship of contrast
because, since, whereas, as if, as, as though, for	show a relationship of cause or reason
before, after, ever since, since, while, until, as long as, when, immediately, soon, today, yesterday, next, subsequently, first (second, third . . .)	show a relationship of time
above, beyond, near(er), left *or* right, under, across, through, opposite	show a relationship in space
hence, therefore, thus, otherwise	show a relationship of result or consequence
so that, in order that, that	show a relationship of purpose or result
where, wherever	show a relationship of place
although, if, provided that, than, even though, though, while	show a relationship of contrast or concession
if, unless, whether or not	show a relationship of condition
inasmuch as, to the extent that	show a relationship of degree
for instance, for example, thus, to illustrate, in particular	give an example
thus, in conclusion, therefore, finally, in short, overall	summarize
indeed, in fact, truly	emphasize

Finally, remember that a paragraph is a visual help to the reader and that enormous blocks of print are not appealing to him. But remember, too, that firing off my short paragraphs in quick succession can also be distracting.

10.II.1 SUMMARIZING.

1.- Everything has a *beginning*, a *climax* or *development* and an *end*. Therefore, try to structure your composition with different paragraphs.

B To begin with / First of all, ...__________

D Therefore / However / ...__________

E Finally / In brief / Summing up... __________

2.- If in your development there is more than one idea or topic, then devote a different paragraph to each.

D __________ Advantages

__________ Disadvantages

3.- Link your ideas, sentences and paragraphs with suitable connectors or transitional words in order to avoid a telegraphic style.

Introductory. "*First we shall discuss X and then consider what implications this has for Y. Finally, we shall describe Z.*"

Transition. "*Having discussed X, we must now consider its implications for Y.*"

Summary. "*We have shown the importance of X in the development of Y. In addition we have demonstrated the role of Z.*"

4.- If you are describing how a process or cycle works or develops in time, specifying the different stages that take place, then use time adverbs (*first*, *then*, *at that stage*, *next*, *finally*, etc).

EXERCISES.

1.- Divide this group of sentences into TWO PARAGRAPHS:

1. The capacitance of a capacitor depends on three factors: the area of the plates, the distance between them, and the dielectric material which separates them. 2. Capacitance varies directly with the area of the plates but is inversely proportional to the distance betwen them. 3. In other words, the closer the plates, the greater the capacitance. 4. Dielectric materials are graded according to their dielectric constant. 5. The greater the dielectric constant, the greater the capacitance will be. 6. Capacitors can be classified according to the types of dielectric used. 7. General purpose capacitors have wax- or oil-impregnated paper as their dielectric. 8. Other types are named according to the dielectric used as mica, ceramic, and electrolytic. 9. A final type, which uses air as the dielectric, is the variable capacitor. 10. It is most commonly used as the tuning capacitor in radio receivers.

TOPIC of the 1st paragraph:
TOPIC of the 2nd paragraph:

2.- Divide this group of sentences into three paragraphs. The paragraph topics are:

PARAGRAPH 1 How a transformer works
PARAGRAPH 2 The ideal transformer
PARAGRAPH 3 The practical transformer

The transformer is a device which changes the magnitude of alternating voltages. It consists of two coils, a primary and a secondary, wound round a ferromagnetic core. The coils are insulated from each other. When an alternating voltage is applied to the primary, an emf is induced in the coil. At the same time an emf is induced in the secondary coil. In an ideal transformer the induced emf per turn in the primary coil will equal the emf induced per turn in the secondary. The ideal transformer has no losses in the electric circuit or in the magnetic circuit. In addition, no current is required to magnetize the core and it has losses. These are of three kinds: hysteresis loss, eddy-current loss and winding losses. Hysteresis loss can be reduced by using high-quality steel, eddy-current loss by laminating the core but little can be done about winding losses. In modern transformers they account for a high percentage of the total loss.

Now add a suitable introductory paragraph, transition paragraphs or sentences and a summary paragraph to the paragraphs in Stage 1.

3.- Divide these group of sentences into three paragraphs. The topics are:

PARAGRAPH 1	The disadvantages of continuous wave radar
PARAGRAPH 2	The principle of pulse radar
PARAGRAPH 3	The operation of a pulse radar system

1. A simple continuous wave radar system can detect a target.
2. It receives its own transmitted signal.
3. The transmitted signal is reflected from the target.
4. It cannot show how far away the target is.
5. It cannot distinguish one part of the transmitted signal from any other part.
6. Pulse radar provides information on the range of a target.
7. It transmits short pulses.
8. It does not transmit a continuous wave.
9. At the instant of transmission a timing device is set in motion.
10. The reflected signal is received.
11. The timing device is stopped.
12. The range can be calculated.
13. The transmitter generates a radio frequency.
14. The radio frequency may be 5 GHz.
15. The rf signal is fed in short bursts or pulses through a switch.
16. The switch opens briefly.
17. The switch allows the pulse to pass to the antenna.
18. A small part of the transmitted signal is fed to an attenuator.
19. The attenuated signal activates a trigger.
20. The trigger starts the horizontal sweep of the crt.
21. The horizontal axis of the crt becomes the time scale.
22. The time of transmission is marked by a vertical blip on this axis.
23. The antenna switch opens to the receiver.
24. The reflected pulse is received.
25. The received pulse is detected.
26. The detected pulse is fed to the Y plates of the crt.
27. A vertical blip appears on the screen at a position on the horizontal axis.
28. The position corresponds to the time of reception.
29. This can be compared with the time of transmission.
30. The target range can be calculated.

Now improve your paragraphs by linking some of the sentences together. Use methods of linking sentences and ideas you have studied in earlier units. You may add words or phrases of your own.

4.- Study this passage carefully and answer the questions which follow:

SUPERCONDUCTIVITY

The resistance of metals varies with their temperature. When they get hot, their resistance increases. When they cool, their resistance falls. The resistance of some metals and alloys steadily decreases as their temperature is lowered, then falls suddenly to a negligible value at temperatures a few degrees above absolute zero (–273°C). In other words, these materials have almost no resistance to an electric current at very low temperatures. They become almost perfect conductors. This is called superconductivity. It occurs only with certain materials, for example lead, and only at very low temperatures.

The practical applications of superconductivity are limited because of the very low temperatures required. A number of uses, however, have been proposed. If a current is induced by a magnetic field in a ring of superconducting material, it will continue to circulate when the magnetic field is removed. In theory this could be made use of in the memory cells of computers. Memory cells made of superconducting materials could store information indefinitely. Because of the zero resistivity of the cells, the information could be retrieved very quickly, as fast as 10^{-8} seconds.

A high percentage of the total losses in modern transformers is due to the resistance of the windings. Transformers could be made with windings cooled to the low temperatures at which superconductivity occurs. The resistance of the windings would be zero and the transformer would be almost ideal. Similarly a 100% efficient electric motor has been proposed using the magnetic field of superconducting coils.

1. Name a superconducting material.
2. When do materials exhibit superconductivity?
3. Why are the practical applications limited?
4. What applications have been proposed?
5. What advantages would a memory cell made of a superconducting material have?
6. How efficient would transformers and motors be which used superconductivity?

Summarizing.

Now complete this summary of the passage using your answers.

Some materials, for example____________________, become almost perfect conductors at____________________.
The applications of superconductivity are limited because
____.
Possible uses are_____________________________________.
A superconducting memory cell would allow information_____
____.
A transformer or motor using superconductivity would be___
____.

10.III **PUNCTUATION.**

These signals help the reader to interpret a text correctly because they clarify the meaning of words in a sentence.

*This section on punctuation is not a complete review of all the components of punctuation. Its purpose is to highlight those punctuation marks that, when not used correctly, can lead to confusion and misinterpretation of a text. This section will review the **colon**, the **semicolon**, the **comma**, and **quotation marks used with other punctuation.**

Colon (:). The colon is used most frequently to emphasize the information that follows it. There are several reasons to throw the emphasis forward: to list (as a means of explanation), to explain (the information given before the colon), and to illustrate a long quotation.

To list:

> In order to graduate, students need to be proficient in several areas: reading, writing, and computing information of a technical nature.

To explain:

> There are several reasons to throw the emphasis forward: to list, to explain, and to illustrate a long quotation.

To illustrate a quotation:

> C. M. Reesey addressed the need for engineers to write clearly when he said:
>
> > Writers are expected to think technically, creatively and objectively. They must know . . .

The Semicolon (;). The semicolon is used to separate two independent clauses in a compound sentence, as explained earlier. As you will remember, these independent clauses must be closely related in thought, or it will be necessary to use a conjunctive adverb as well.

> Engineering and technology go hand in hand; it is hard to say which flows from which.
>
> Engineering and technology go hand in hand; indeed, it is hard to say which flows from which.

We also use the semicolon when the use of the comma might prove ambiguous or if the clauses and phrases are very long.

> We will use my book, *A Handbook for Technical Communication*; my associate's book, *Technical Prose*; and a good style sheet.

The Comma (,). Perhaps the most misused of all the punctuation marks, the comma can be the cause of a great deal of confusion when misused. There are many rules governing the use of the comma; this text will list some of them. These rules are important in helping the reader decode meaning in written communication and in eliminating confusion.

1. As explained in the section on sentence types, it is necessary to use the comma in various sentence patterns.

After an introductory dependent clause (complex sentence):

When we finish school, we expect to get good jobs in industry.

After an introductory phrase containing a verb form:

The technical lecture having been cancelled, the students went home.

To separate two independent clauses joined by a coordinating conjunction (compound sentence):

They were engineering students, and they were scientists.

2. Commas are used to prevent misreading that could lead to confusion.

When the tutor phoned William, Henry answered.

When the tutor phoned, William Henry answered.

Commas are used to separate items in a series:

Scientists must study statistics and math, research methodology, scientific or engineering information, and some humanities.

Commas are used to separate contrasting ideas:

He didn't ask for the beaker, but for the petri dish.

3. Commas are used to enclose information that is nonrestrictive in nature. *Nonrestrictive* means information that is not necessary for understanding the meaning of the sentence.

Our experiment, which our class developed as a class project, tests the level of toxicity in plants.

(N.B. Usually, *which* clauses are considered nonrestrictive.)

A restrictive clause, on the other hand, contains information necessary for understanding the meaning of the sentence. Use *that* for restrictive clauses, not *which*.

Our experiment that will test the level of toxicity in plants is to be a class project.

Look at the following two sentences. Both are punctuated correctly. Using the preceding explanation, explain the difference in meaning between the two sentences.

1. My sister, Lisa, goes to law school.
2. My sister Lisa goes to law school.

In sentence 1, the name is enclosed in commas because the author has only one sister; thus, the name is irrelevant for processing the information in the sentence. In sentence 2, the name is not enclosed in commas because the author has more than one sister, making the inclusion of the name necessary for understanding the sentence.

Quotation Marks with Other Punctuation. The purpose of this section is to demonstrate the format governing quotation marks when they are used with other punctuation.

1. When quotation marks are used with commas and periods, put the commas and periods inside the quotation marks:

Almost daily, the public is besieged with new "anti-cancer foods," powerful "anti-aging vitamins," and other wonderful items from the "modern-day, snake-oil seller."

2. Put semicolons and colons outside the quotation marks:

The author said that "Americans believe in good health"; moreover, she thought it to be a wise trend.

3. Put question marks, dashes, and exclamation points inside the quotation marks only if they apply to the quoted material:

"Do I have to read the whole book?" she asked.

Did she say, "I have to read the whole book"?

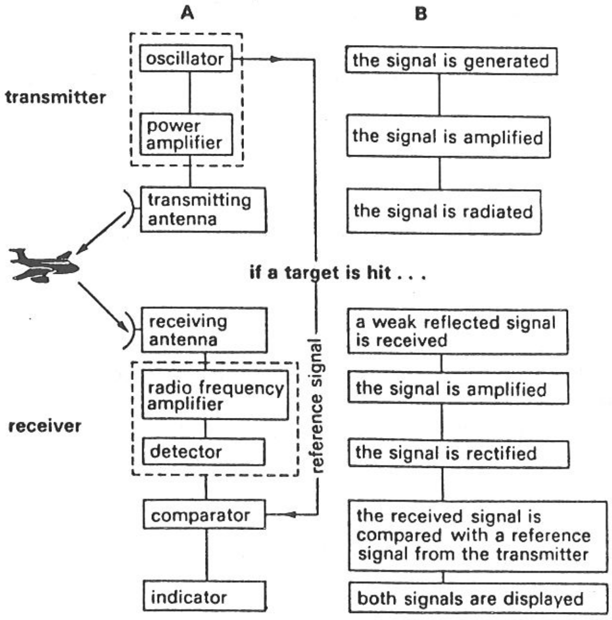
EXERCISES.

1.- Read the following text and put punctuation marks in their proper places.

> Potassium chloride a substance often sold in health food stores as a diet supplement is potentially dangerous indeed its overuse can be fatal.
>
> Accidental overuse of potassium chloride sometimes called potassium salt is known to have caused deaths of otherwise healthy individuals moreover potassium chloride supplements and other products labeled as "salt substitutes" which contain potassium should not be used by people with certain medical conditions.
>
> Overuse of potassium chloride supplements by healthy individuals can cause hyperkalemia (excessively high levels of potassium in the blood) a potentially fatal condition. In a recent case that received national publicity a mother administered large amounts of potassium chloride (3,000 milligrams one day and 1,500 milligrams the next day) to her 2-month old baby as a remedy for "colic." The mother was following the advice of a book by the late Adelle Davis entitled *Let's Have Healthy Children*. The child died despite medical efforts to reduce body potassium levels. . . .
>
> The FDA says that "at present potassium chloride supplements and salt substitutes are not required to carry warning labels about potential health hazards" however the FDA proposes that soon all such products must carry a warning. One must assume that the mother of the "colicky baby" surely wonders "why such a warning is not on all potassium supplements"[10]

2.- Look at this diagram of a simple radar system. Column A describes the components and how they are related. Column B lists the stages in the operation of the system in sequence.

Answer these questions about the diagram and, using your answers, write a description of a simple radar system bearing in mind what you have learnt about paragraphs and punctuation.



1. What does a simple radar system consist of?
2. What does the transmitter comprise?
3. What does the receiver include?
4. Where is the signal generated?
5. What happens to the signal next?
6. How is the transmitter signal radiated?
7. If a target is hit, what receives the reflected signal
8. Where is the signal then fed to?
9. What happens to the signal in the receiver?
10. Where is the signal fed to next?
11. What happens in the comparator?
12. What happens to both signals finally?

10.IV WHEN WRITING APPLICATION LETTERS AND A C.V.

Employment applications are part of a company's personnel record for each employee. The information you supply on the application form helps the interviewer know what questions to ask about your education, training and experience. Look at this ecxample;

Sample Résumé

Lillian Sample
1435 North Shore Drive
Chicago, Illinois 60611
(312) 328-7743

Position Sought: Buyer for major retail clothing store.

Experience: *Assistant Buyer* — Carroll's Red Hanger Shop
1978-1984 — 566 North State, Chicago, IL 6060

Responsible for ordering all men's ready-to-wear clothing and accessories. Handled budgets up to $250,000. Increased sales 20 percent in two years. Supervised three assistants and one secretary.

Sales Clerk — Geske's Clothes
1976-1978 — 34 Virginia Street, Urbana, IL 618

Handled all sales transactions in men's and boys' wear. Responsible for special orders and customer relations.

Education: B.A. in business and marketing, June 1976, University of Illinois, Champaign-Urbana, IL

Honors: Edwin Ebert Marketing Award, 1975-1976
Delta Tau honorary business society, 1974
AID Scholarship, 1973

Activities: Vice President, Delta Tau, 1975-1976
Big Ten Marketing Exhibit, organizer, 1975

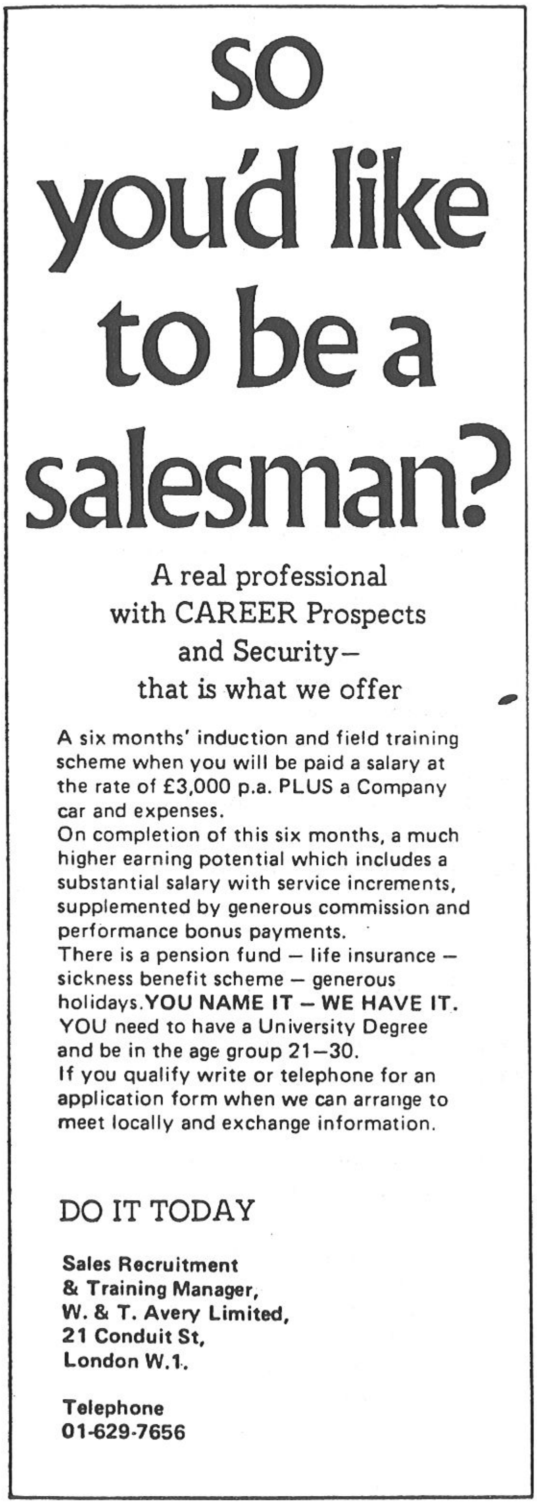
References:

Mr. Harold Walker
General Manager
Carroll's Red Hanger Shop
566 North State
Chicago, IL 60606
(312) 445-7384

Mrs. Leslie Geske
Owner
Geske's Clothes
34 Virginia Street
Urbana, IL 61801
(217) 459-6533

Other references furnished upon request.

Look at this advertisement from a daily newspaper offering a position as salesman. Then read the application letter for that post.



so you'd like to be a salesman?

A real professional
with CAREER Prospects
and Security–
that is what we offer

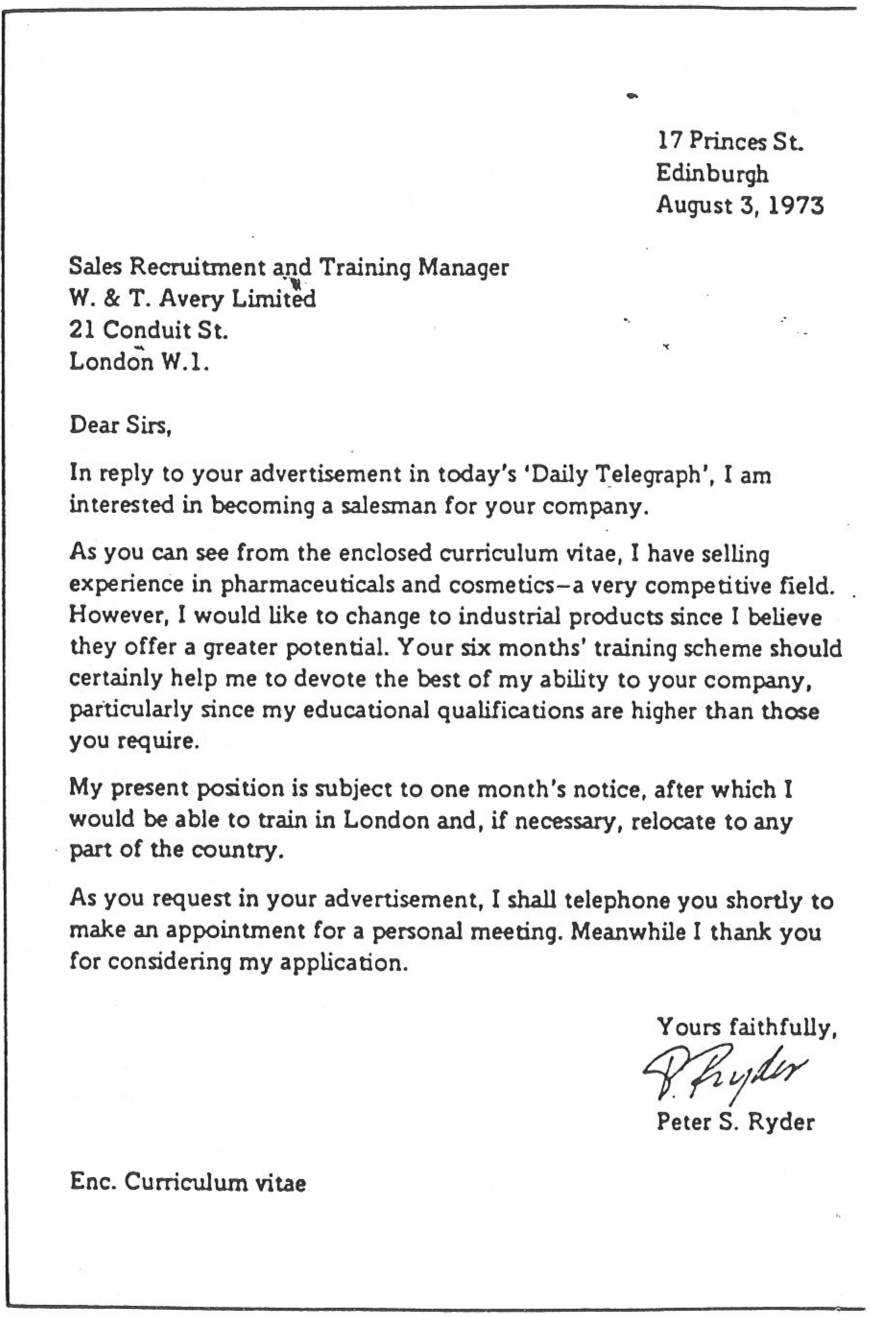
A six months' induction and field training scheme when you will be paid a salary at the rate of £3,000 p.a. PLUS a Company car and expenses.
On completion of this six months, a much higher earning potential which includes a substantial salary with service increments, supplemented by generous commission and performance bonus payments.
There is a pension fund – life insurance – sickness benefit scheme – generous holidays.**YOU NAME IT – WE HAVE IT.**
YOU need to have a University Degree and be in the age group 21–30.
If you qualify write or telephone for an application form when we can arrange to meet locally and exchange information.

DO IT TODAY

Sales Recruitment
& Training Manager,
W. & T. Avery Limited,
21 Conduit St,
London W.1.

Telephone
01-629-7656

a) Application



17 Princes St.
Edinburgh
August 3, 1973

Sales Recruitment and Training Manager
W. & T. Avery Limited
21 Conduit St.
London W.1.

Dear Sirs,

In reply to your advertisement in today's 'Daily Telegraph', I am interested in becoming a salesman for your company.

As you can see from the enclosed curriculum vitae, I have selling experience in pharmaceuticals and cosmetics–a very competitive field. However, I would like to change to industrial products since I believe they offer a greater potential. Your six months' training scheme should certainly help me to devote the best of my ability to your company, particularly since my educational qualifications are higher than those you require.

My present position is subject to one month's notice, after which I would be able to train in London and, if necessary, relocate to any part of the country.

As you request in your advertisement, I shall telephone you shortly to make an appointment for a personal meeting. Meanwhile I thank you for considering my application.

Yours faithfully,
P. Ryder
Peter S. Ryder

Enc. Curriculum vitae

Look at this other example:

August 23, 19--

Mr. Bernard Houston
Senior Editor
BioMed Publications, Inc.
723 Oriole Trail
Milwaukee, WI 53215

Dear Mr. Houston:

I am writing in regard to the medical writer's position that your company advertised in the August 21 issue of the *Milwaukee Chronicle.* As a medical writer with ten years' experience in the field of biomedical engineering, I am particularly interested in your company's publications and audience.

You indicated in your job description that you are looking for someone with experience in medical journalism and reporting. I have worked for several major medical and science journals, among them *Science News*, *Biomedical Products*, *Medicine & Science*, and *Journal of the American Medical Association.* My responsibilities included covering assigned topics, meeting tight deadlines, and interviewing experts in various fields. I have also assisted in magazine and newsletter production. I believe my experience gives me the special skills you are seeking.

The details of my education, work history, and publications are outlined in the enclosed resume. I would appreciate talking with you about the position at your earliest convenience. If you would like copies of my articles or any additional information, please let me know. I can be reached at the number below from 9:00 AM to 5:00 PM.

Sincerely,

Linda Pastan
562 Trailways Road
Madison, WI 54306
(321) 378-9902

Phrases

Applications

With reference to your advertisement in 'The Times' of Friday, January 4th, I would like to apply for the position of . . . in your company.

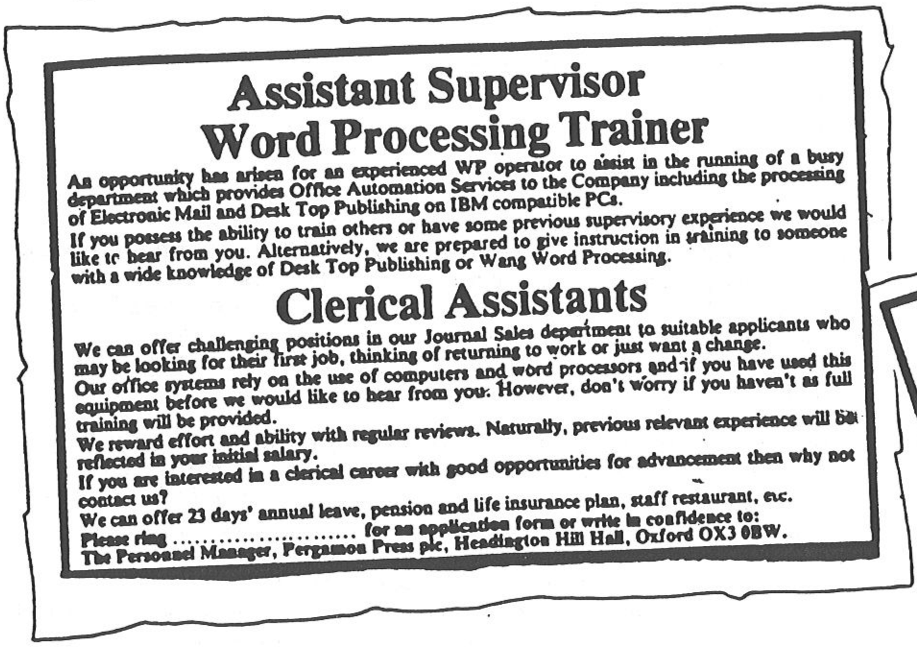
I recently heard from . . . that there is a vacancy in your accounts department.

Please refer to the enclosed curriculum vitae/personal data sheet for further particulars.

I am used to working on my own.

Read these pages taken from the job vacancies of a local newspaper and choose one of them, fill in the application form on page 137 and write an application letter for the job chosen.

①



Assistant Supervisor
Word Processing Trainer

An opportunity has arisen for an experienced WP operator to assist in the running of a busy department which provides Office Automation Services to the Company including the processing of Electronic Mail and Desk Top Publishing on IBM compatible PCs.

If you possess the ability to train others or have some previous supervisory experience we would like tc hear from you. Alternatively, we are prepared to give instruction in training to someone with a wide knowledge of Desk Top Publishing or Wang Word Processing.

Clerical Assistants

We can offer challenging positions in our Journal Sales department to suitable applicants who may be looking for their first job, thinking of returning to work or just want a change.

Our office systems rely on the use of computers and word processors and if you have used this equipment before we would like to hear from you. However, don't worry if you haven't as full training will be provided.

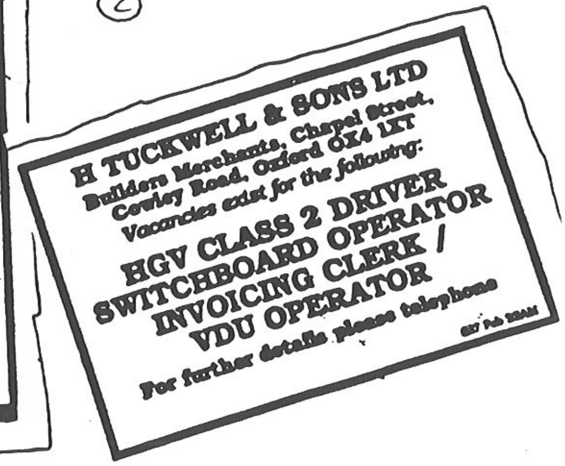
We reward effort and ability with regular reviews. Naturally, previous relevant experience will be reflected in your initial salary.

If you are interested in a clerical career with good opportunities for advancement then why not contact us?

We can offer 23 days' annual leave, pension and life insurance plan, staff restaurant, etc.

Please ring .... for an application form or write in confidence to:
The Personnel Manager, Pergamon Press plc, Headington Hill Hall, Oxford OX3 0BW.

②

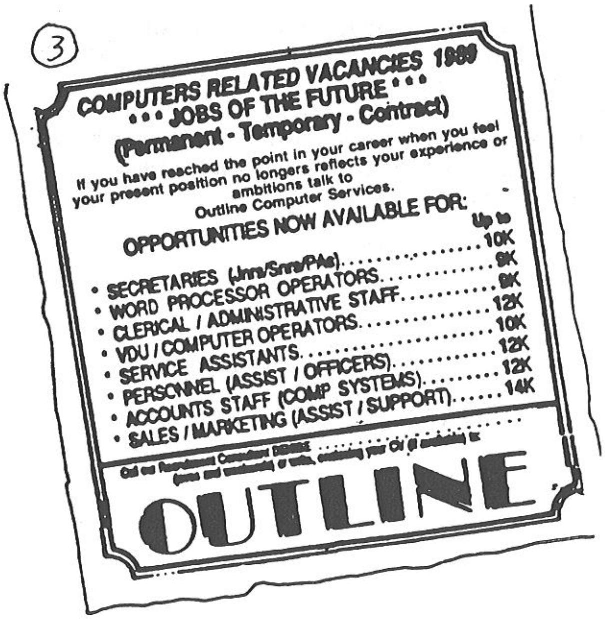


H TUCKWELL & SONS LTD
Builders Merchants, Chapel Street,
Cowley Road, Oxford OX4 1XT
Vacancies exist for the following:

HGV CLASS 2 DRIVER
SWITCHBOARD OPERATOR
INVOICING CLERK /
VDU OPERATOR

For further details please telephone

③



COMPUTERS RELATED VACANCIES 1989
• • • JOBS OF THE FUTURE • • •
(Permanent - Temporary - Contract)

If you have reached the point in your career when you feel your present position no longers reflects your experience or ambitions talk to
Outline Computer Services.

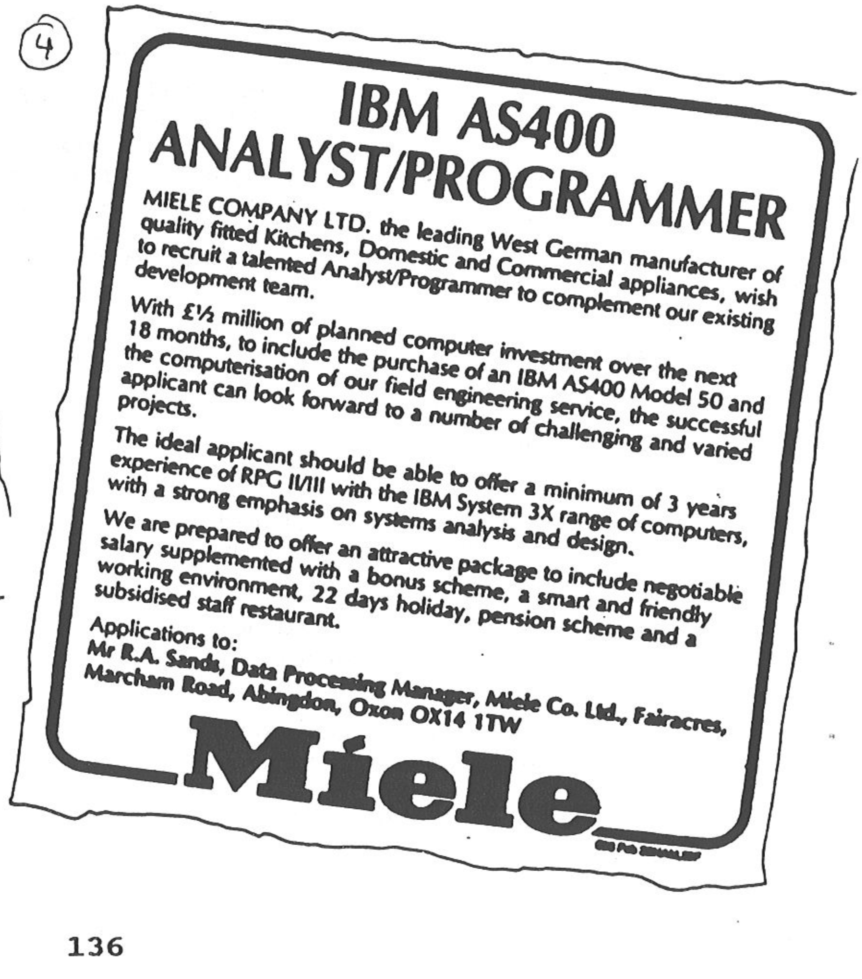
OPPORTUNITIES NOW AVAILABLE FOR:

	Up to
• SECRETARIES (Jnrs/Snrs/PAs)	10K
• WORD PROCESSOR OPERATORS	9K
• CLERICAL / ADMINISTRATIVE STAFF	9K
• VDU / COMPUTER OPERATORS	12K
• SERVICE ASSISTANTS	10K
• PERSONNEL (ASSIST / OFFICERS)	12K
• ACCOUNTS STAFF (COMP SYSTEMS)	12K
• SALES / MARKETING (ASSIST / SUPPORT)	14K

Call our Recruitment Consultant DENISE .... [illegible]

OUTLINE

④



IBM AS400
ANALYST/PROGRAMMER

MIELE COMPANY LTD. the leading West German manufacturer of quality fitted Kitchens, Domestic and Commercial appliances, wish to recruit a talented Analyst/Programmer to complement our existing development team.

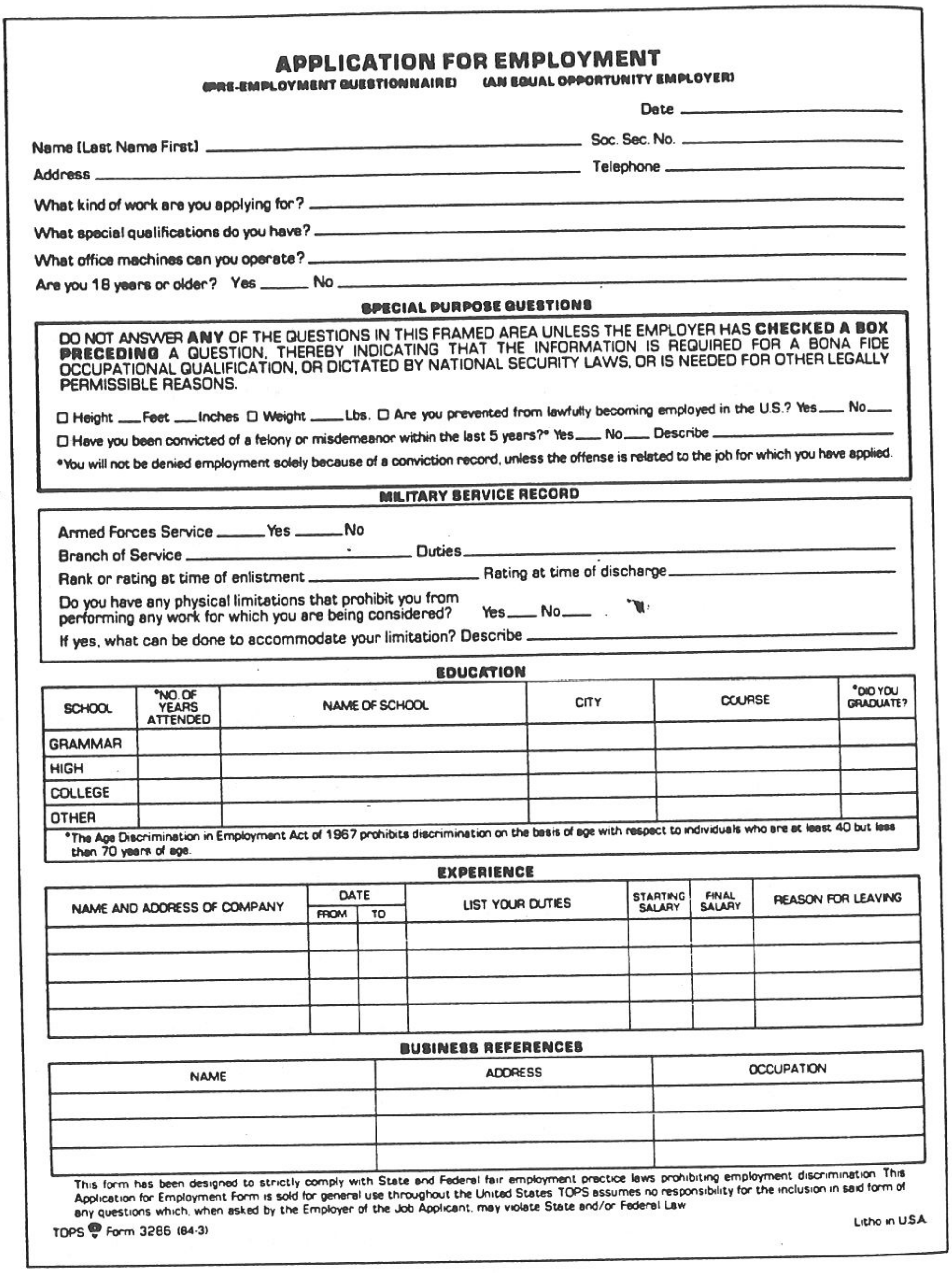
With £½ million of planned computer investment over the next 18 months, to include the purchase of an IBM AS400 Model 50 and the computerisation of our field engineering service, the successful applicant can look forward to a number of challenging and varied projects.

The ideal applicant should be able to offer a minimum of 3 years experience of RPG II/III with the IBM System 3X range of computers, with a strong emphasis on systems analysis and design.

We are prepared to offer an attractive package to include negotiable salary supplemented with a bonus scheme, a smart and friendly working environment, 22 days holiday, pension scheme and a subsidised staff restaurant.

Applications to:
Mr R.A. Sands, Data Processing Manager, Miele Co. Ltd., Fairacres, Marcham Road, Abingdon, Oxon OX14 1TW

Miele



APPLICATION FOR EMPLOYMENT

(PRE-EMPLOYMENT QUESTIONNAIRE) (AN EQUAL OPPORTUNITY EMPLOYER)

Date ______________

Name (Last Name First) ______________ Soc. Sec. No. ______________

Address ______________ Telephone ______________

What kind of work are you applying for? ______________

What special qualifications do you have? ______________

What office machines can you operate? ______________

Are you 18 years or older? Yes ______ No ______

SPECIAL PURPOSE QUESTIONS

DO NOT ANSWER **ANY** OF THE QUESTIONS IN THIS FRAMED AREA UNLESS THE EMPLOYER HAS **CHECKED A BOX PRECEDING** A QUESTION, THEREBY INDICATING THAT THE INFORMATION IS REQUIRED FOR A BONA FIDE OCCUPATIONAL QUALIFICATION, OR DICTATED BY NATIONAL SECURITY LAWS, OR IS NEEDED FOR OTHER LEGALLY PERMISSIBLE REASONS.

☐ Height ___Feet ___Inches ☐ Weight _____Lbs. ☐ Are you prevented from lawfully becoming employed in the U.S.? Yes___ No___

☐ Have you been convicted of a felony or misdemeanor within the last 5 years?* Yes___ No___ Describe ______________

*You will not be denied employment solely because of a conviction record, unless the offense is related to the job for which you have applied.

MILITARY SERVICE RECORD

Armed Forces Service ______Yes ______No

Branch of Service ______________ Duties ______________

Rank or rating at time of enlistment ______________ Rating at time of discharge ______________

Do you have any physical limitations that prohibit you from performing any work for which you are being considered? Yes___ No___

If yes, what can be done to accommodate your limitation? Describe ______________

EDUCATION

SCHOOL	*NO. OF YEARS ATTENDED	NAME OF SCHOOL	CITY	COURSE	*DID YOU GRADUATE?
GRAMMAR					
HIGH					
COLLEGE					
OTHER					

*The Age Discrimination in Employment Act of 1967 prohibits discrimination on the basis of age with respect to individuals who are at least 40 but less than 70 years of age.

EXPERIENCE

NAME AND ADDRESS OF COMPANY	DATE		LIST YOUR DUTIES	STARTING SALARY	FINAL SALARY	REASON FOR LEAVING
	FROM	TO				

BUSINESS REFERENCES

NAME	ADDRESS	OCCUPATION

This form has been designed to strictly comply with State and Federal fair employment practice laws prohibiting employment discrimination. This Application for Employment Form is sold for general use throughout the United States. TOPS assumes no responsibility for the inclusion in said form of any questions which, when asked by the Employer of the Job Applicant, may violate State and/or Federal Law.

TOPS Form 3286 (84-3)

Litho in USA

Appendices

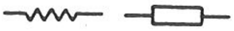
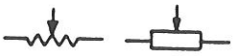
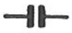
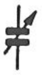
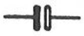
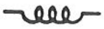
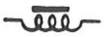
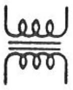
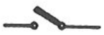
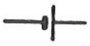
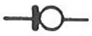
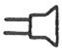
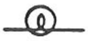
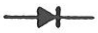
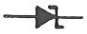
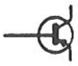
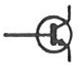
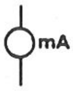
I MATHEMATICAL SYMBOLS USED IN ELECTRICAL ENGINEERING AND ELECTRONICS

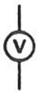
SYMBOL	EXAMPLE	MEANING IN FULL
·	3·14159	three *point* one four one five nine
$+$	$R_1 + R_2$	R one *plus* R two
$-$	$V - V_1$	V *minus* V one
$\pm$	$\pm$ 3 dB	*plus or minus* three decibels
$=$	$R = R_1 + R_2$	R *equals/is equal to* R one plus R two
$\approx$ or $\triangleq$	$I \approx 28$ mA	I *is approximately equal to* twenty eight milliamps
$\times$	$f \times 120$	f *times/multiplied by* one hundred and twenty
no sign between two quantities	$E = IR$	E equals I *times/multiplied by* R
one quantity over another	$\frac{I}{R}$	I *over/divided by* R *The ratio of* I *to* R
$\propto$	$I \propto V$	I *is proportional* to V
:	11:1	eleven *to* one
%	10%	ten *per cent*
°	30°C	thirty *degrees* celcius (Centigrade)
$\sqrt{\ }$	$\sqrt{5}$	*the square root of/root of* five
^{2} ^{3}	R^2 X^3	R *squared*; X *cubed*
$^{-8}$	10^4 10^{-8}	ten *to the power four*; ten *to the power minus eight*
$>$	$>$10dB	*greater than* ten decibels
$<$	$<$25mA	*less than* twenty-five milliamps
$\leqslant$	$\leqslant$5W	*less than or equal to* five watts

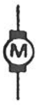
II TERMS, SYMBOLS, UNITS AND ABBREVIATIONS USED IN ELECTRICAL ENGINEERING AND ELECTRONICS

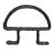
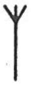
TERM	SYMBOL	UNIT	ABBREVIATION
admittance	Y	siemens	S
capacitance	C	farad	F
charge	Q	coulomb	C
conductance	G	siemens	S
conductivity	σ (sigma) γ (gamma)	siemens per metre	S/m
current	I	ampere	A
electric field strength	E	volt per metre	V/m
electric flux	Q	coulomb	C
electric flux density	D	coulomb per square metre	C/m^2
electromotive force	E	volt	V
frequency	f	hertz	Hz
frequency, angular	ω (omega)	radian per second	rad/s
frequency, resonant	f_r	hertz	Hz
gain	A	—	—
inductance	L	henry	H
inductance, mutual	M	henry	H
impedance	Z	ohm	Ω
magnetic field strength	H	ampere per metre	A/m
magnetic flux	ϕ (phi)	weber	Wb
magnetic flux density	B	tesla	T
magnetomotive force	F	ampere	A
permeability	μ (mu)	henry per metre	H/m
permittivity	ε (epsilon)	farad per metre	F/m
phase angle	ϕ (phi)	radian	rad
power, apparent	S	volt-ampere	VA
power, reactive	Q	var	vars
power, true	P	watt	W
reactance	X	ohm	Ω
reactance, capacitive	X_C	ohm	Ω
reactance, inductive	X_L	ohm	Ω
reluctance	S	ampere per weber	A/Wb
resistance	R	ohm	Ω
resistivity	ρ (rho)	ohm per metre	Ω/m
susceptance	B	siemens	S
voltage	V	volt	V

III CIRCUIT SYMBOLS USED

1. resistor 
2. variable resistor 
3. capacitor 
4. variable capacitor 
5. electrolytic capacitor 
6. coil/winding 
7. choke/iron-cored inductor 
8. transformer 
9. switch 
10. fuse
11. cell 
12. microphone 
13. loudspeaker 
14. bulb/lamp 
15. diode 
16. Zener diode 
17. pnp transistor 
18. npn transistor 
19. milliammeter 

20. voltmeter 

21. motor 

22. bell 
23. antenna 
24. earth/ground